

Software Products

SP-1

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Software Products Market Forecast

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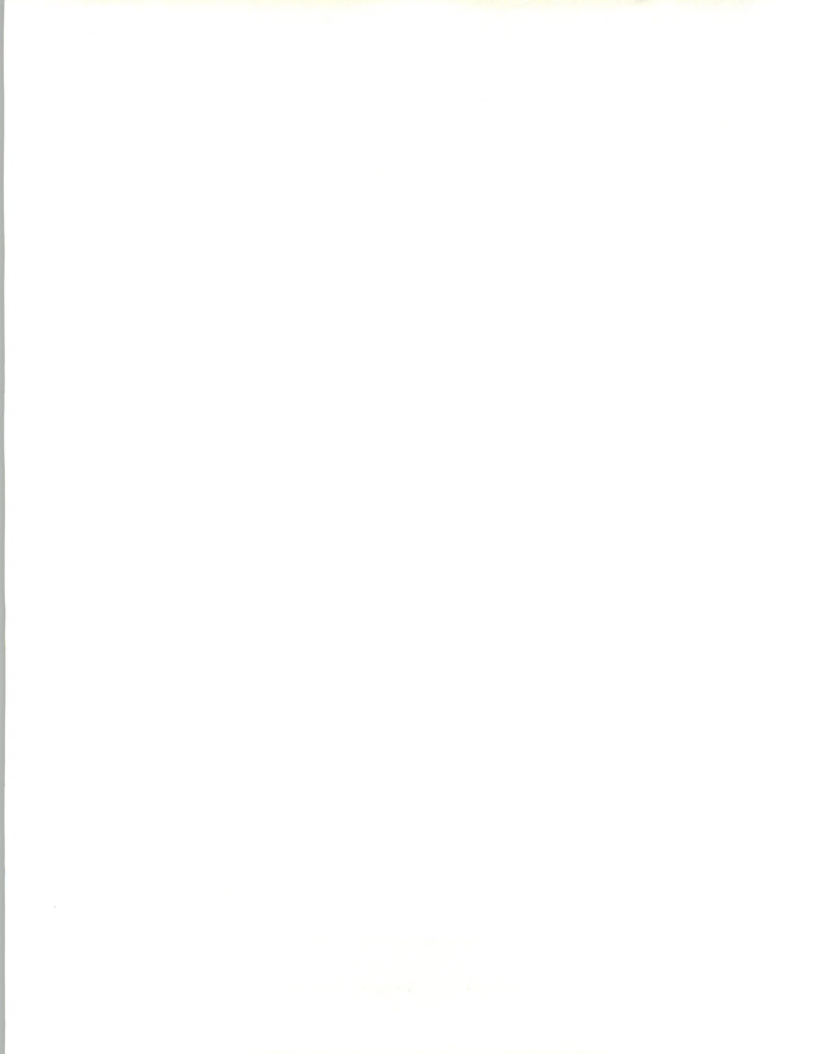


Software Product Environment

- User needs
- Technology
- Business environment
- Complementary services

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User-Related Driving Forces

- "Standards"
- Scaleability
- Multi:
 - Vendor
 - Tasking
 - User
- "Transparency"

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User Needs

- Application sophistication
- Heterogeneous hardware/environment
- Dynamic connectivity/cooperative processing
- Resource sharing/groupware

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User Needs

- Improved user productivity
- Workstation support
- Image processing
- Improved development process

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Technology Impacts

- New platforms/devices
 - AS/400, PS/2, parallel processors, supercomputers, RISC
- Networking/LANs

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Technology Impacts

- Improved resources
 - Memory, storage, MIPS
- On-line transaction processing
- Multimedia
- Image/video

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Technology Impacts

- Operating systems
 - UNIX, Pick, OS/2, MS/DOS
- Server/client relationships
- Cooperative processing
- Image processing

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Software Products Market Trends

- Enterprise-wide data access
- Distributed processing
 - Client/server/cooperative processing
 - Peer-to-peer processing
- Object-oriented technologies
- Focus on interoperability

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Software Products Market Issues

- Hardware and software development moving toward synchronization
- Software vendors promoting a number of "de facto" standards
- Technical, not market, differentiation

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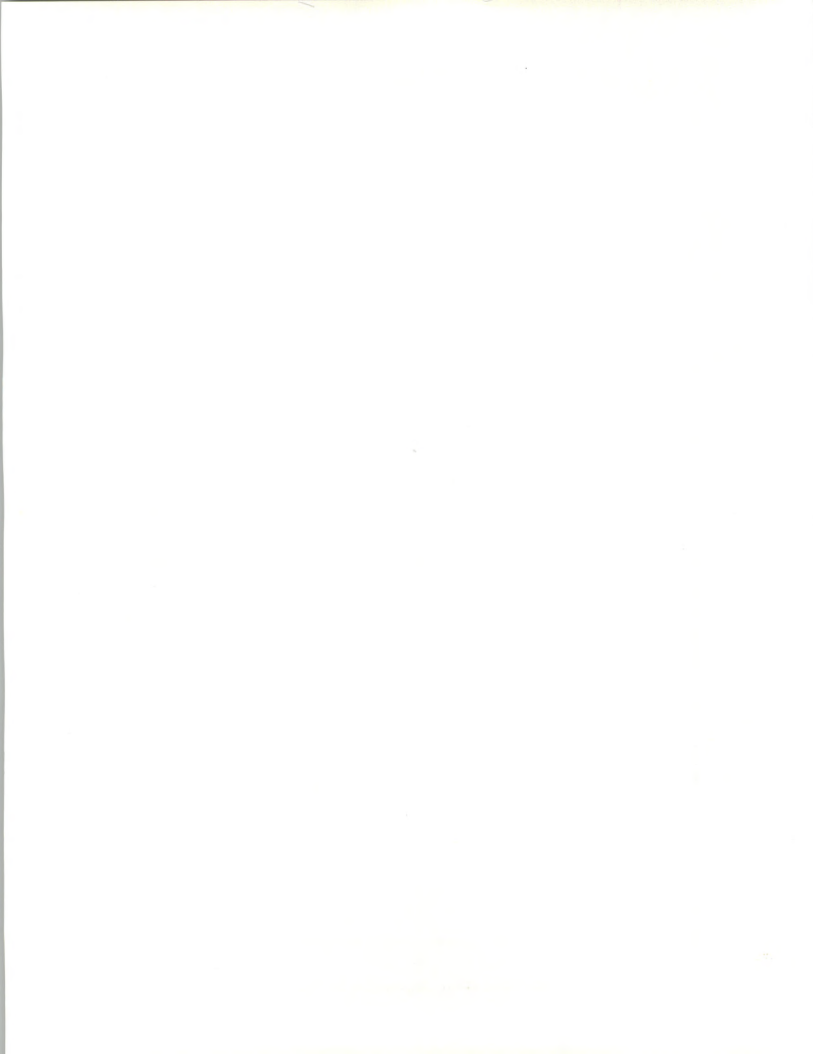


Software Products Market Issues

- Software complexity increasing
- Development resources decreasing
- Product life cycles
- Capital supply constraints
- Redundant software products

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Vendor-Related Driving Forces

- Computer equipment
 - Link disparate product lines
 - Leverage system software
 - Leverage 3rd party software relationships

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Notes



Vendor-Related Driving Forces

- Computer software
 - Leverage software development efforts
 - Maximize equipment vendor relationships

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Complementary Services

- Consulting
- Education and training
- Software development
- Systems integration
- Software integration

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Leading Software Market Trends

- Standards
- Internationalization
- Company-wide project management software
- Bundled solutions

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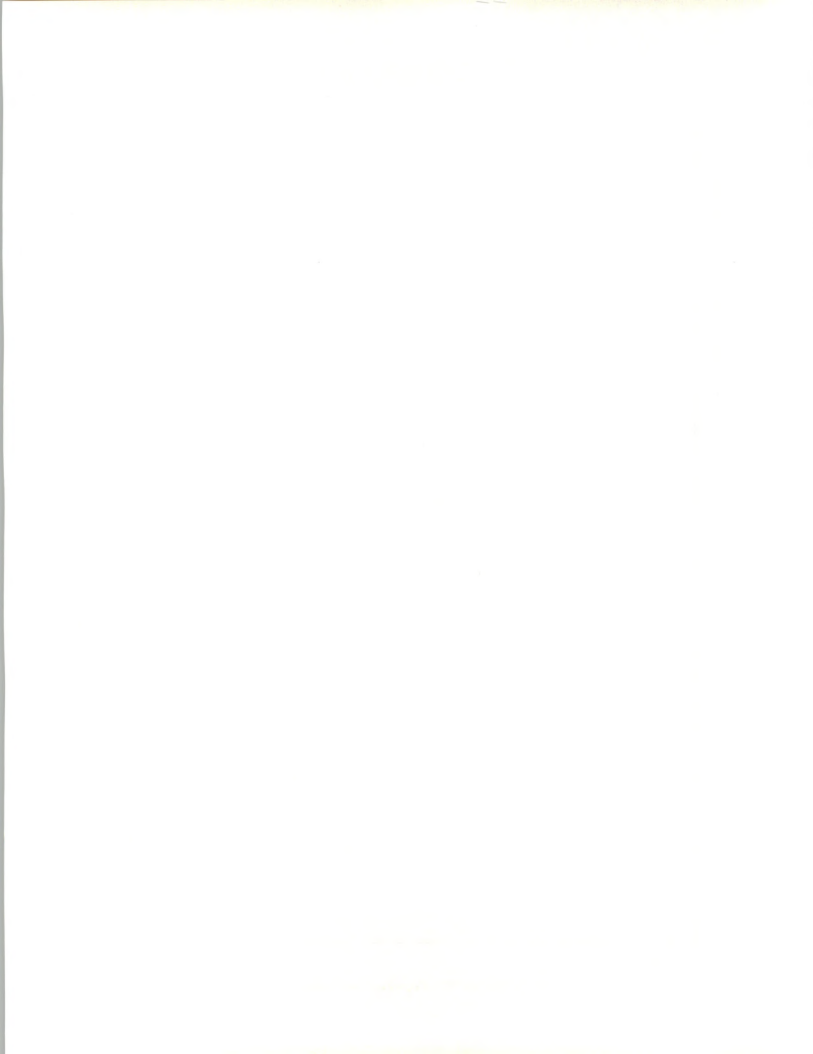


Leading Software Market Trends

- Mergers/acquisitions
- Alliances
- Open systems architectures
- Products and services markets blurring
- Cooperative processing models

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Software Products

Systems Software

- Mainframe
- Mini
- Micro/workstation

Applications Software

- Mainframe
- Mini
- Micro/workstation

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Systems Software Products

- Application development tools
- Data center management
- Systems control

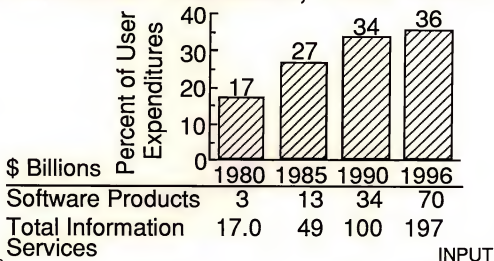
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Software Products Portion of Information Services, 1980-1996

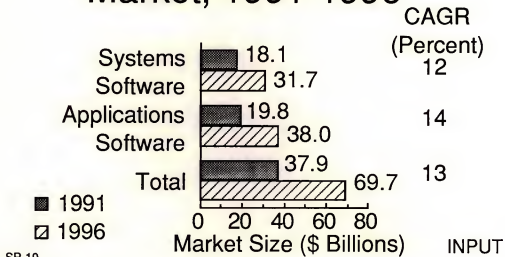


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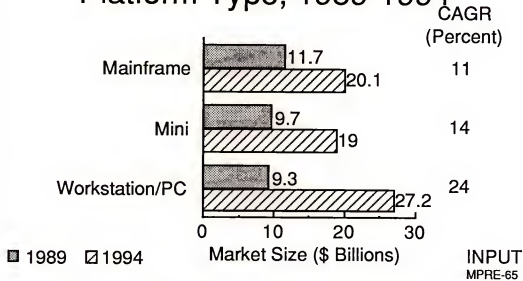
U.S. Software Products Market, 1991-1996



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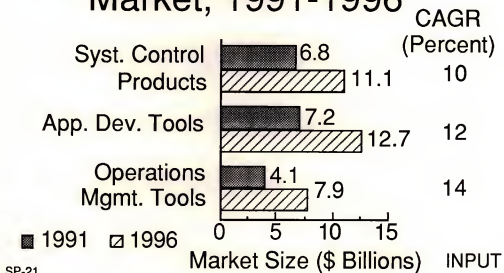
U.S. Software Products Market by Platform Type, 1989-1994



Notes



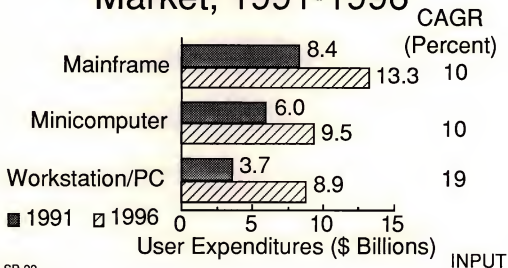
Systems Software Products Market, 1991-1996



Notes



Systems Software Products Market, 1991-1996



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Systems Software Products Market—Driving Forces

- Cooperative processing
- Image processing
- CASE/4GL
- Standards (SQL/UNIX, others)
- Consolidation

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Systems Software Products Market—Driving Forces

- PC development environments
- Staging for new applications software growth
- Data center management tools
- RDBMS
- Expert systems

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Systems Software Products Market—Inhibiting Forces

- Computer saturation
- Slowing hardware shipments
- Declining software price per copy
- Delay in standards

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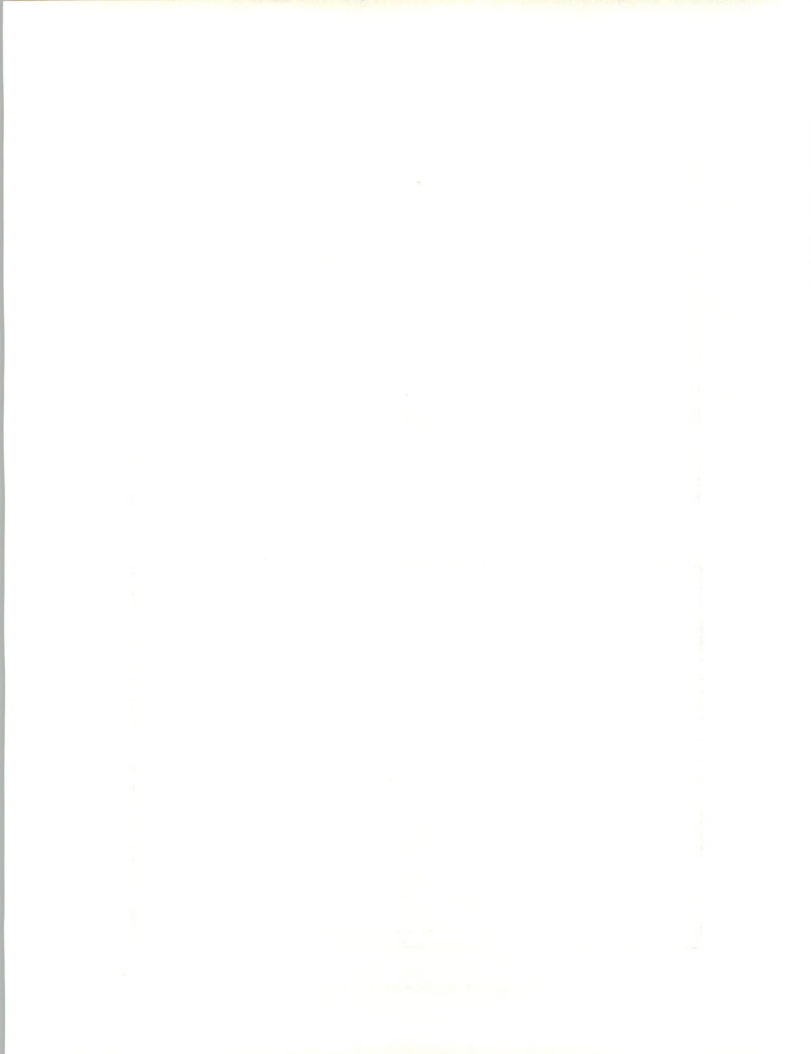
New/Hot Software Areas

- Network integration
- AI—rejuvenated
- Data center management
- UNIX
- Image processing
- DSS/EIS

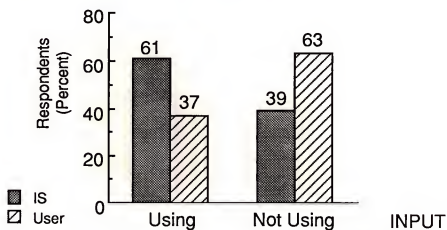
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Relational DBMS Application Who Is Using It?



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Next Generation of DBMSs

- Distributed/networked
- Interconnected
- Relational +
- Information-oriented
- Hardware-assisted

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CASE—Future Directions

- I-CASE
- Professional services companies' critical role
- CASE support services
- Repository element key
- End-user CASE

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Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
IBM Corporation	16
Digital Equipment	3

SP-30a

Notes

Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
Computer Associates	3
Microsoft	3
Hewlett-Packard	2

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Notes

Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
Oracle	2
Novell, Inc.	2
Unisys	1

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Applications Software Products Market—Driving Forces

- CPU population growth
- Standards (evolving)
- Workstation power
- Industry-specific thrusts
- EIS/other emerging niches
- Application complexity

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Applications Software Products Market—Inhibiting Forces

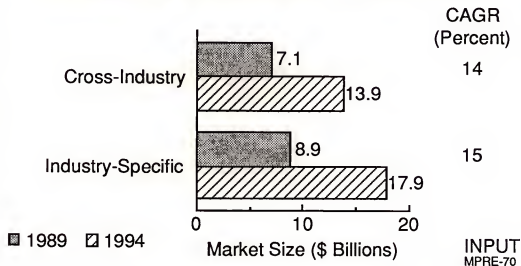
- Mainframe saturation
- Declining price per copy
- Product life cycles
- Crowded market niches

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Notes



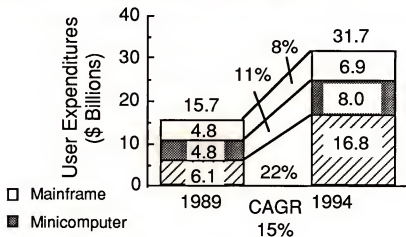
U.S. Applications Software Product Market by Submode, 1989-1994



Notes

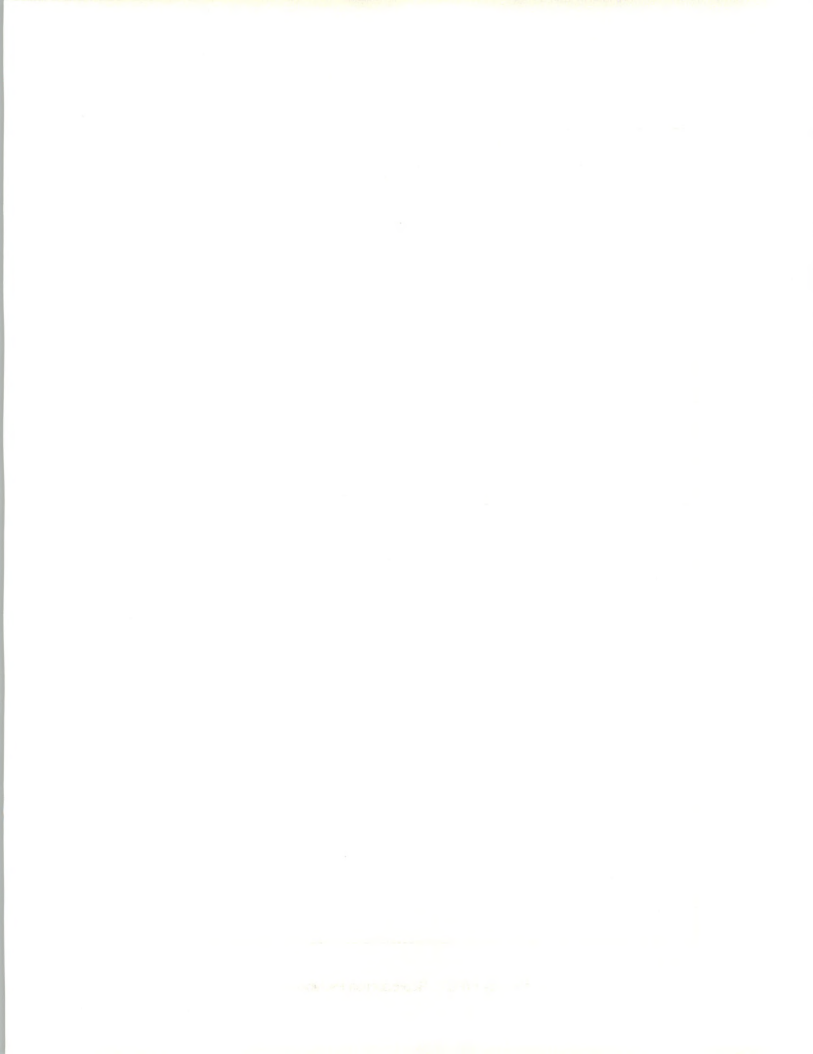


Applications Software Product Market by Platform Size, 1989-1994



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Notes



Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue (\$ M)*	Market Share (%)
IBM	930	7
Lotus Development Corp.	400	3
Digital Equipment Corp.	240	2
Computer Associates	190	2

* INPUT Estimates

INPUT

Notes



Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue (\$ M)*	Market Share (%)
Dun & Bradstreet Corp.	200	1
Management Science America, Inc.	200	1
Unisys Corp.	190	1

* INPUT Estimates

INPUT

Notes

Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue (\$ M)*	Market Share (%)
Hewlett-Packard	150	1
Microsoft	120	1
Word Perfect Corp.	120	1

* INPUT Estimates

INPUT

Notes



Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue (\$ M)*	Market Share (%)
Wang Laboratories	110	1
Ashton-Tate	110	1

* INPUT Estimates

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Barriers to Widespread Acceptance of UNIX

- Lack of personal productivity applications
- Integration of UNIX hardware
- Integration of UNIX software
- Distribution of UNIX software
- Requirements for service and support

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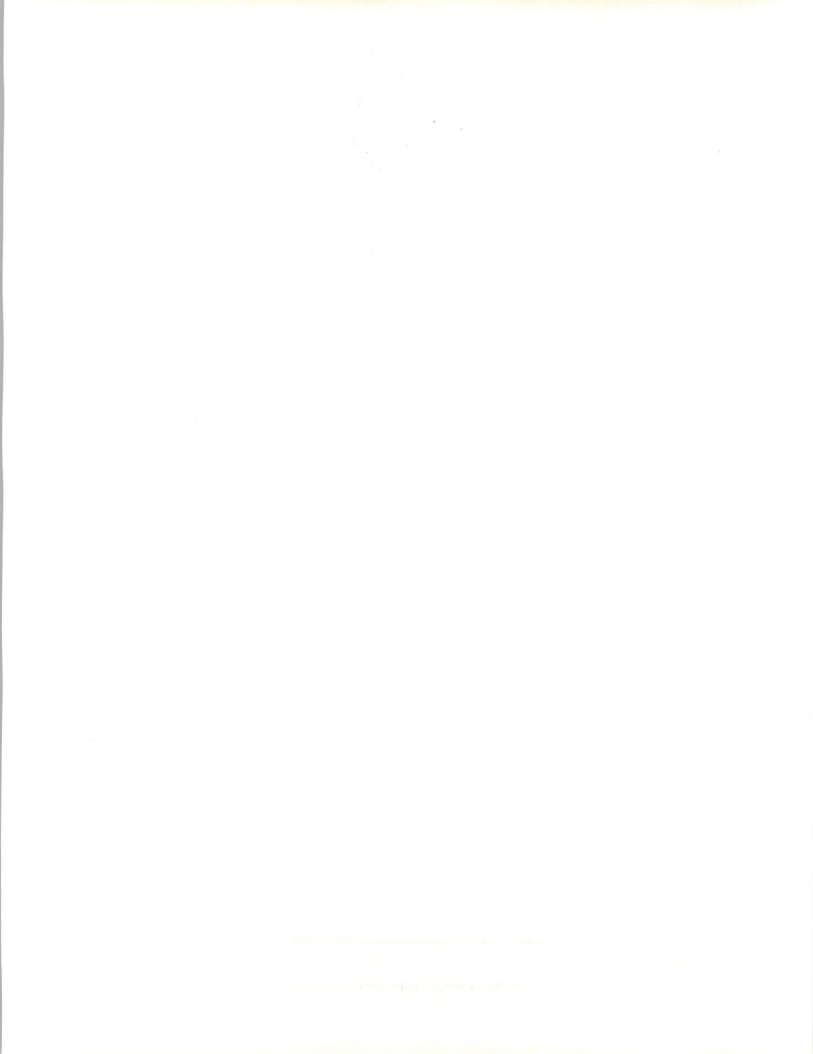


U.S. UNIX Market, 1989-1994

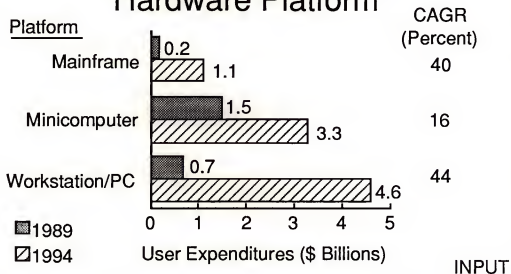
Sector	User Expenditures (\$ Millions)		CAGR 1989-94 (Percent)
	1989	1994	
Systems control	785	3,720	36
Application software			
- Vertical industry	1,150	4,550	32
- Cross-industry	1,335	4,490	27

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Notes



U.S. UNIX Market, 1989-1994 by Hardware Platform



Notes



UNIX Market by Primary Application

Application	Percent of Annual System Shipment Value	
	1989	1994
Commercial	21	31
Engineering, Scientific, Technical	79	69
	100	100

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Notes



Users: How We Selected UNIX

- The future is UNIX
- Manufacturer changed from other operating system to UNIX
- Part of turnkey solution
- Experimental approach

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Notes

Users: Current Use of UNIX

- Primary
 - Software development
 - Business management
- Secondary
 - Office systems
 - Communications
 - Education and training

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Notes



Former Users: Why We Dropped UNIX

- Lack of support
- Did not receive application software updates

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Non-Users: Why Not UNIX?

- Primary: Retraining of unsophisticated users
- Amount of system management effort
- Customer sites using VAX/VMS
- Conversion is too expensive

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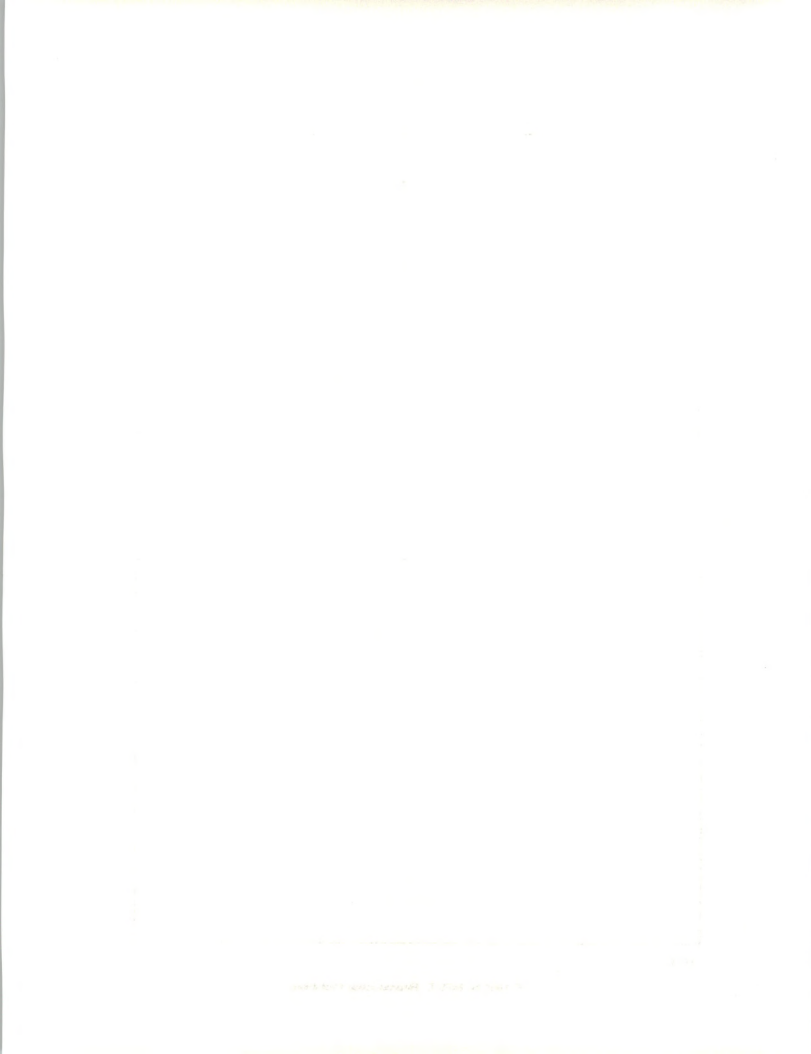
Notes

Software Vendors: Why We Chose UNIX

- Primary
 - Portability
 - Federal government contract requirement
- Secondary
 - Customer requests

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Notes



PC Vendors' UNIX Development Activity

- Survey group: Vendors developing DOS-based application software
- 41% also now developing under UNIX
- 27% plan to develop under UNIX
- 18% examining UNIX opportunities

Source: INPUT ("PC Software Vendor Survey")

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Notes



UNIX and Mainframe Hardware Vendors

- Amdahl: UNIX is key differentiator
- IBM
 - Secondary operating system
 - IBM's "real" UNIX: SAA
 - AIX not linked to SAA yet

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Notes



UNIX and Minicomputer Hardware Vendors

- First-tier vendors (DEC; H-P)
 - Stronger in technical applications
 - Growing in commercial applications
- Second-tier vendors (UNISYS, Nixdorf, Ultimate Corp.)
 - Stronger in commercial applications

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$$f(x) = \int_0^x f(t) dt$$

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UNIX and Workstation/PC Vendors

- Primary role: IBM RT and Sun
- Sun:
 - Proprietary hardware
 - Near-proprietary UNIX, due to "hooks"
 - Bottom line: Creating a separate market
- Secondary role: Apple and IBM PS/2

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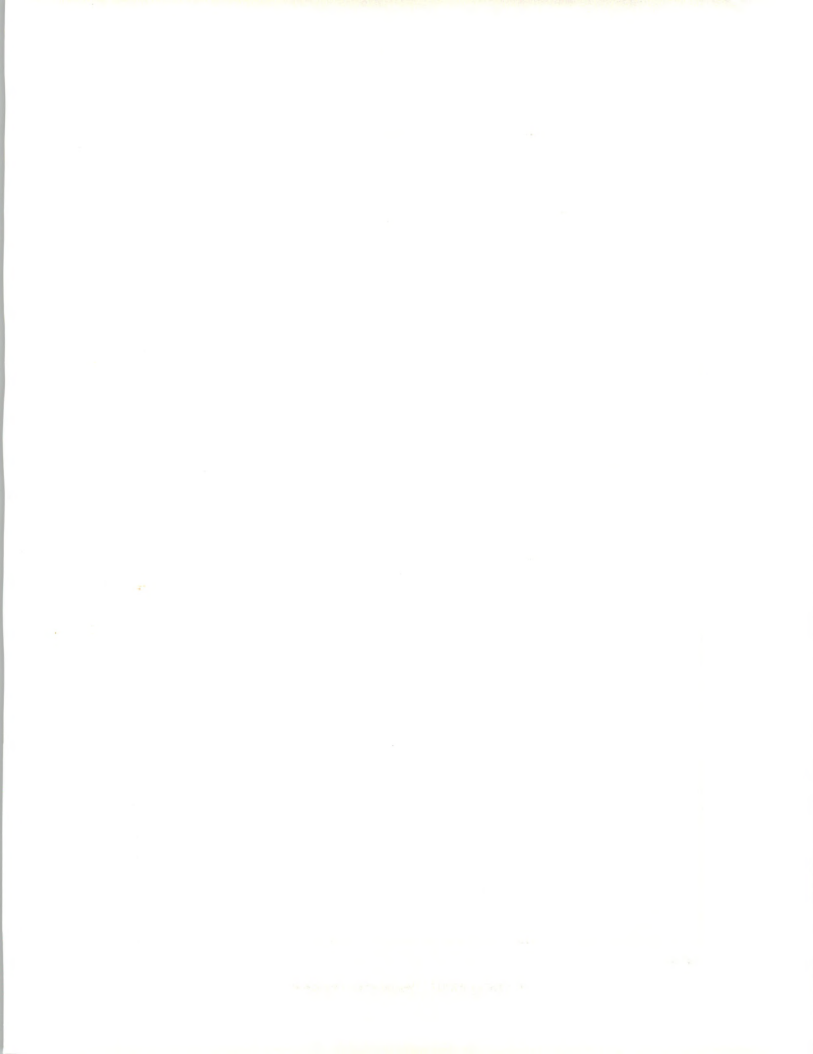
Notes

UNIX and Operating System Vendors

- AT&T likely to add enhancements
 - Transaction processing
 - Fault tolerance
 - Real-time
 - Multiprocessor

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Notes



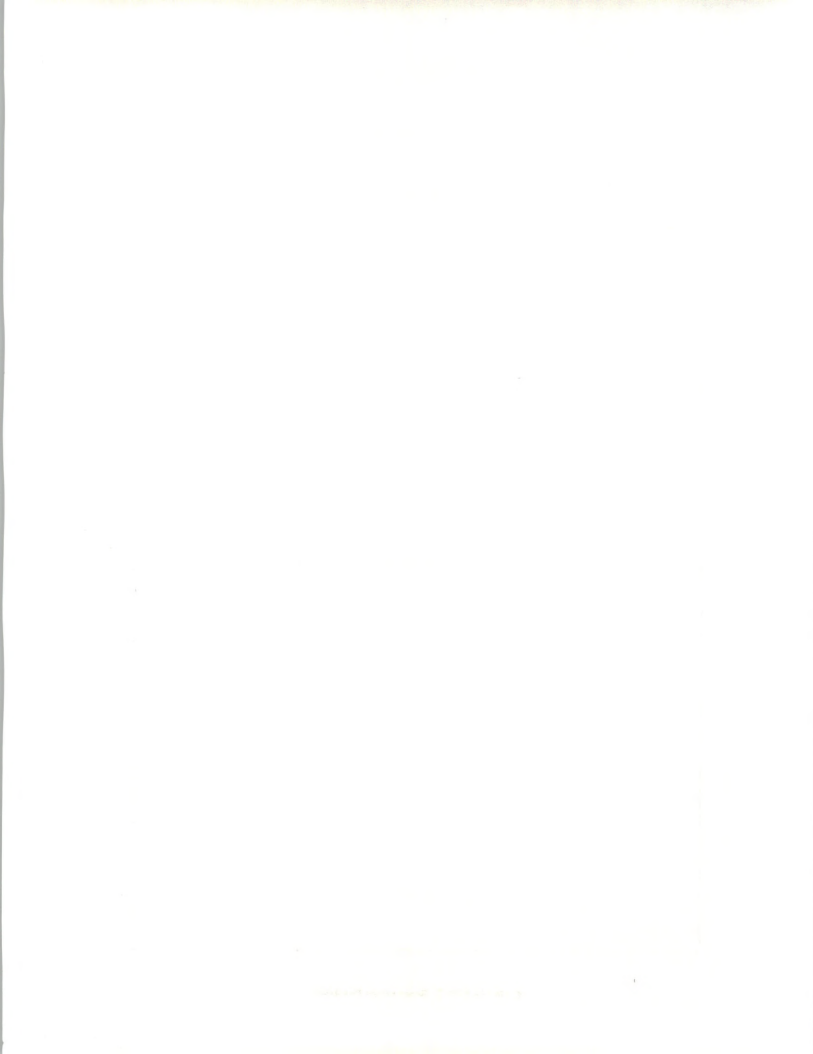
UNIX and Operating System Vendors

- The Santa Cruz Operation (SCO)
 - Differentiating from UNIX System V Release 4
 - Leveraging existing vendor alliances

SP-54a

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Notes



UNIX and Operating System Vendors

- The Santa Cruz Operation (SCO)
 - Creating own market around Intel 80386, using "Open Desktop"
 - Leveraging existing distribution channels

SP-54b

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Notes



UNIX Opportunities

- File servers
- Business applications
- Personal productivity software

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Notes



UNIX Opportunities

- Turnkey systems
 - Departmental
 - Highest added value: Peripherals
- Professional services
- Systems integration

SP-55b

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Notes



Predictions: UNIX Standards

- Operating systems: POSIX compliant
- Languages: C; C++
- Network: TCP/IP
- RDBMS interface: SQL
- Graphical user interface: none
(Caveat: Watch "OSF/Motif")

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Notes

Prediction: UNIX "Winners"

- Consortia: X/open; UI
- System software vendors: AT&T
"linkages"
- Application software vendors: Commercial
- High performance systems: Amdahl
- Mid-range systems: HP; DEC; UNISYS
- Workstations/PCs: IBM; Sun; HP/Apollo

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Recommendations to Vendors

- Adopt any decent graphical user interface
- Bet on "the" standard
- Develop more commercial UNIX applications

SP-58a

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Notes



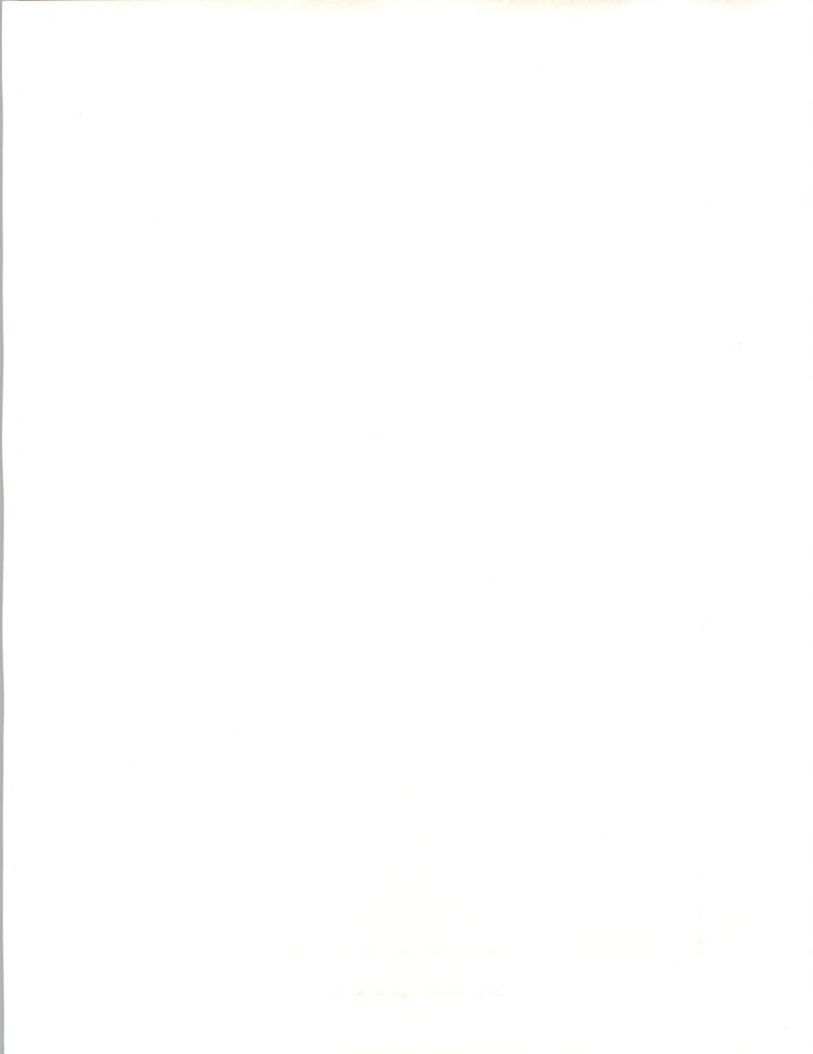
Recommendations to Vendors

- Application software vendors, hedge your bets
- Vendors: No more UNIX "improvements", please
- "Out-Sun" Sun Microsystems

SP-58b

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Notes



AI—Revisited and Rejuvenated

- Front-end applications e.g.,
 - ADR's—mindover
 - Verity—text retrieval
 - etc. . .

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Notes



AI—Revisited and Rejuvenated

- New players
 - Neuron data, natural language
- Old players
 - Teknowledge—withdraws direct marketing
 - Language group—niche oriented
 - Intellicorp—major agreement with IBM

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Notes



KBS Application Types

- Mostly “diagnosing/classifying” applications
- Over 50%: Data analysis, interpretation (Examples: Insurance underwriting, bank lending)

SP-61a

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Notes



KBS Application Types

- About 20%: Use advising, procedures (Example: Help desk)
- Others: Controlling, planning, configuration, simulating

SP-61b

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Notes



KBS Application Builders

- 95% of sample: No end-user development/modification
 - Almost always: "Knowledge engineers" developers

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Notes



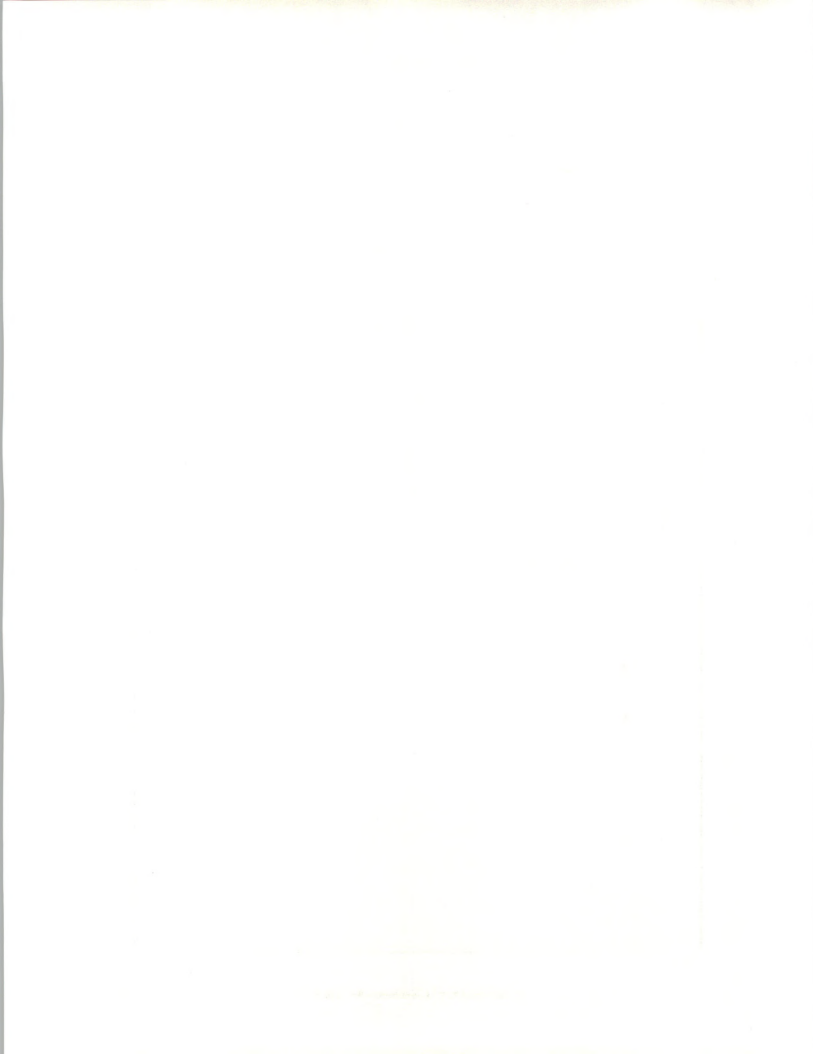
KBS Application Builders

- 95% of sample: No end-user development/modification
 - Mostly: Same person builds knowledge base, programs interfaces, and solves DP environment problems

SP-62b

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Notes



KBS Application Distinctions

	Survey Response (Percent)	INPUT Trend Forecast
Standalone	43	Decrease
Integrated	57	Increase

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Notes



KBS User Satisfaction

Generally satisfied with:

1. Range of capabilities
2. Ease of development
3. Integration with other applications
4. Documentation
5. Customer support and hotline

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Notes



KBS User Satisfaction

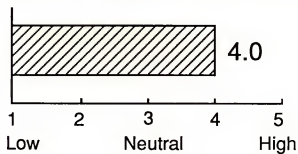
Varying responses

1. Processor resource consumption
2. Response time
3. Maintenance updates

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Notes

Overall Satisfaction with KBS Product



Future plans: uncertain

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Notes



IBM Actions -Major-

- New line of business:
applications solutions
- AS/400 midrange system
 - 1st SAA announcement
 - Software announcement
 - Applications

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Notes



IBM Actions—Major

- OS/2 and OS/2E
- Applications systems division (ASD)
 - Internal and external responsibility for SW
 - 6,000 employees
 - Aggressive third-party program

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Notes



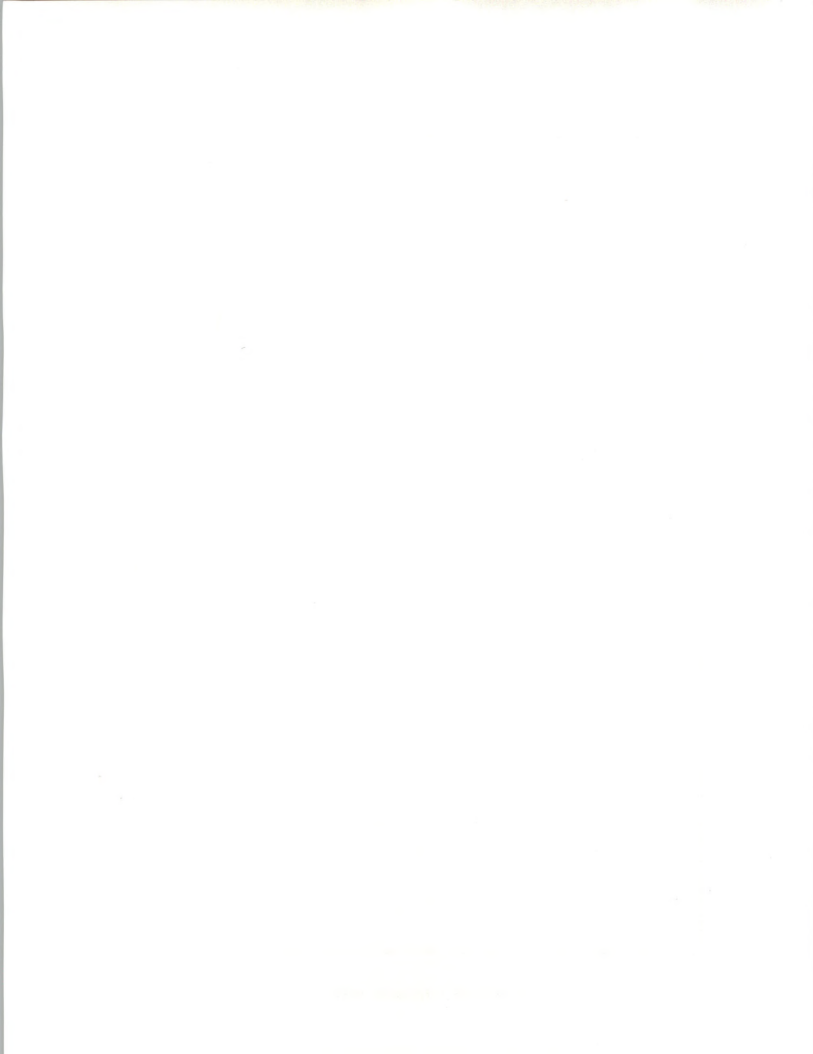
IBM Actions—Major

- Applications systems division (ASD)
 - Internal focus
 - CIM
 - Office systems
 - Customer information file

SP-68b

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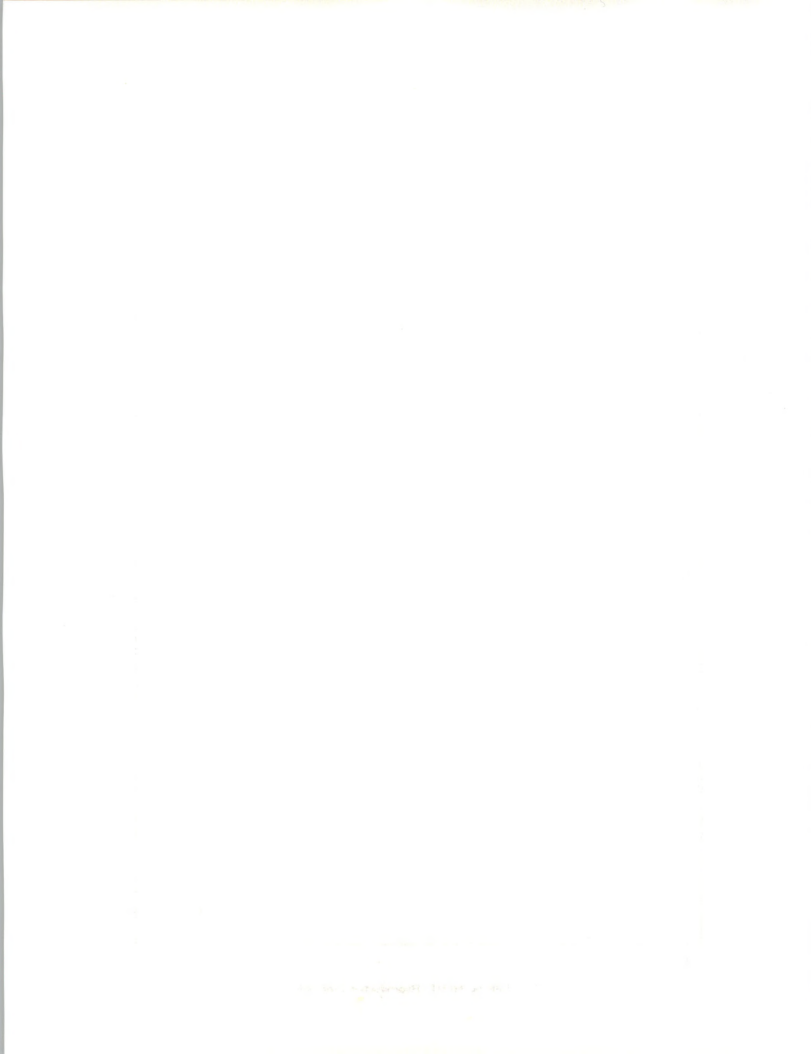


SAA

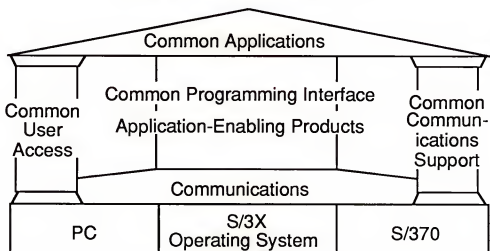
- Single most important event
- Unfolding in software products market

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Notes



SAA—What Is It?



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Notes



SAA Shortfall

- Moving target
- All platforms/OS not covered
- All languages not covered
- Networking limitations
- Lack of documentation
- Missing important application-enabling components

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Notes



SAA—Conclusions

SAA will:

- Drive product consolidation
- Be a user requirement
- Drive new applications/products
- Drive software pricing
- Reshape the software industry

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Open Software Foundation

Background

- Sun/AT&T form strategic relationship
- Other UNIX-oriented vendors band together in response

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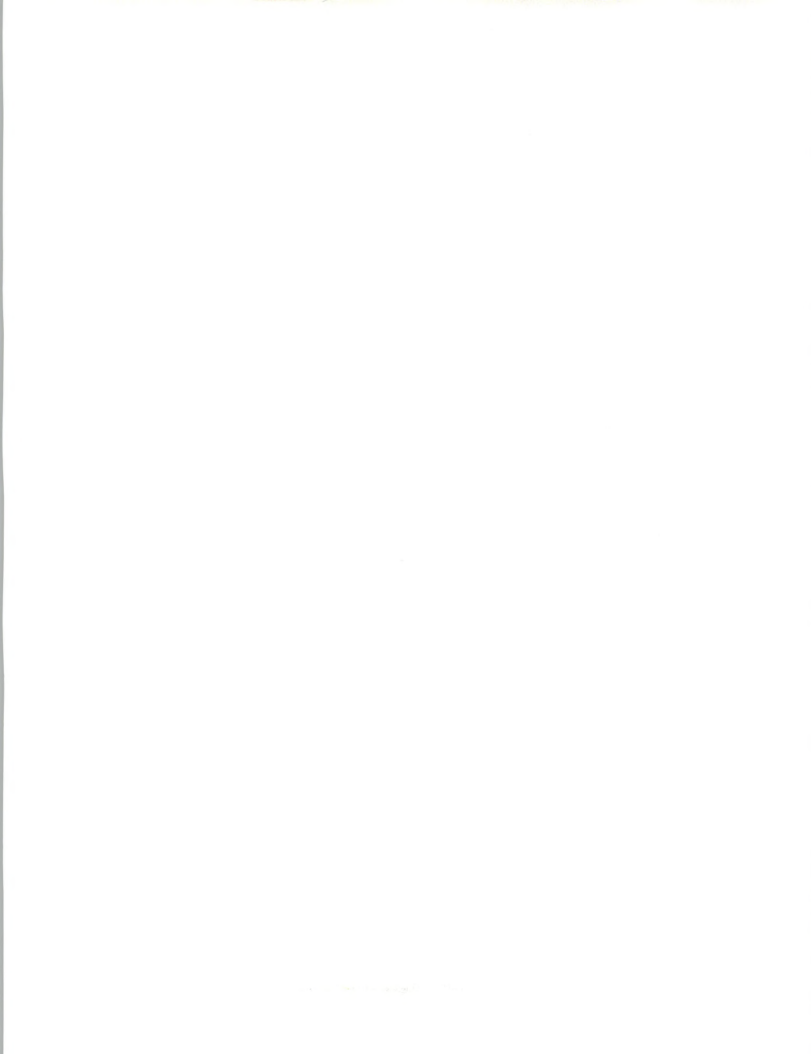
Open Software Foundation -Formation-

Result

- Not-for-profit group
- Seven original founders
 - Apollo, Groupe-Bull, DEC, HP, IBM, Nixdorf, Siemens
- \$13.5M over 3 years for sponsors
- \$25K/year for associates

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Alliances

- CASE vendors
 - Front-end/back-end
- Relational Technology/Computer Task Group/Westinghouse
- Cullinet/SHL Systemhouse

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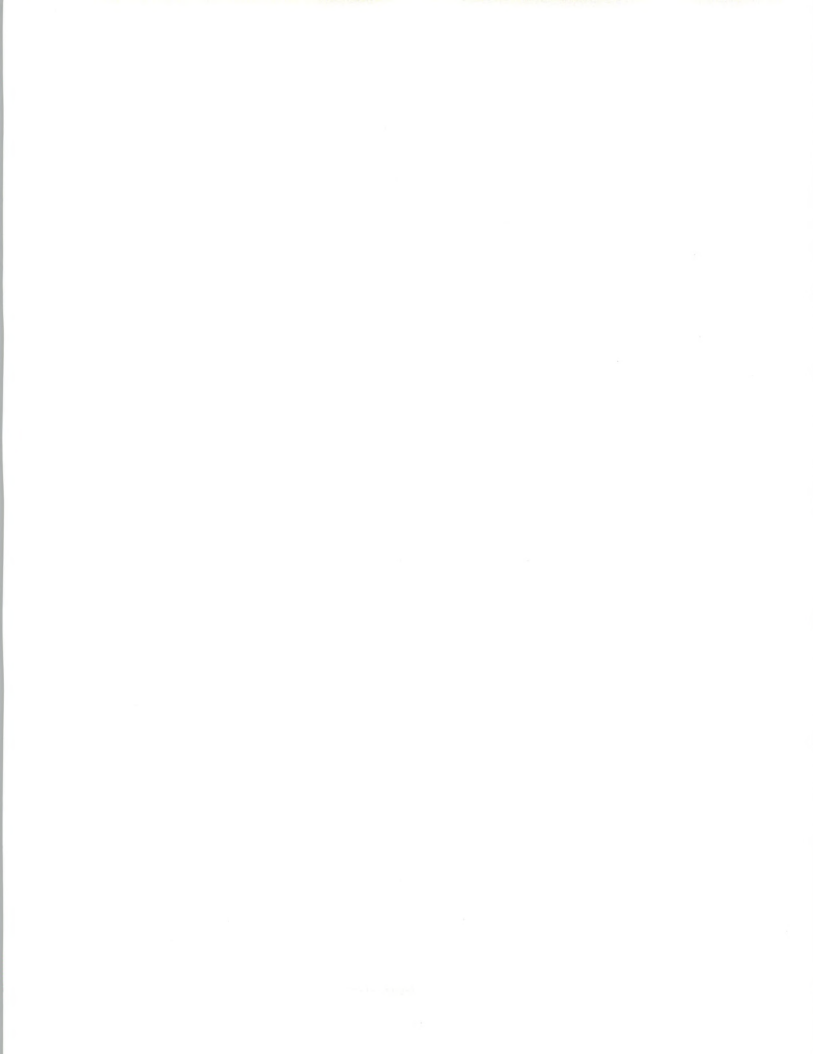
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Alliances

- CAI/Unisys
- Ashton-Tate/Microsoft/Sybase
- DEC/Apple

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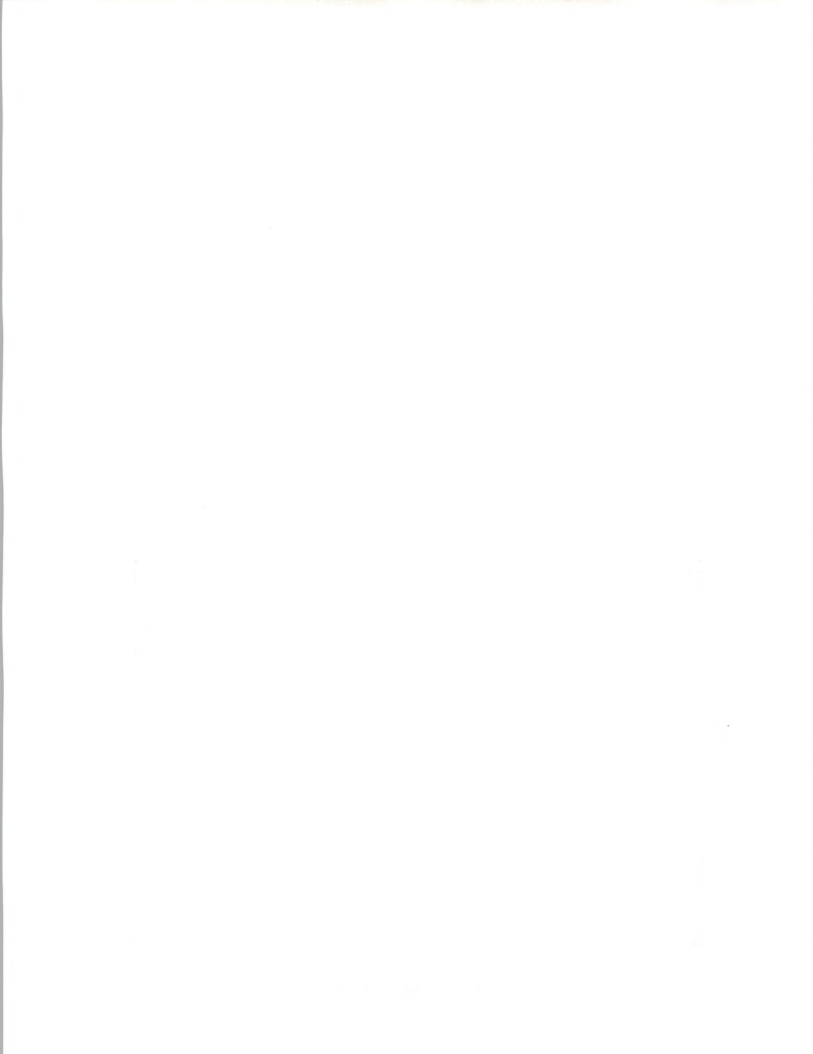


Software Vendor Profile for Success

- Large installed base
- Heterogeneous hardware support
- Applications/systems product basket
- Hardware independence
- Strong financial resources

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Executive Information Systems (EIS)

SP-78

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12/18/90



EIS Study Research Methodology

- Mail Survey - 126 POSPP Members
- Telephone Interviews - 20 EIS Users
- Telephone Interviews - 16 EIS Vendors

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EIS Technical Foundation

1. Fourth-generation language use by end users
2. Decision support systems
3. Personal computers
4. Relational data base management systems

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Breaking New Ground with EIS

1. New category of user
2. Relational data base management systems
3. Information versus data
4. Graphical user interface
5. Integration of personal productivity tools
6. Cooperative processing

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Notes

1. The first part of the report is a general introduction to the subject.

2. The second part is a detailed description of the methods used.

3. The third part is a discussion of the results.

4. The fourth part is a conclusion.

5. The fifth part is a bibliography.

6. The sixth part is a list of figures.

7. The seventh part is a list of tables.

8. The eighth part is a list of appendices.

9. The ninth part is a list of references.

10. The tenth part is a list of footnotes.

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12. The twelfth part is a list of abbreviations.

13. The thirteenth part is a list of definitions.

14. The fourteenth part is a list of acronyms.

15. The fifteenth part is a list of units.

16. The sixteenth part is a list of formulas.

17. The seventeenth part is a list of diagrams.

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74. The seventy-fourth part is a list of acronyms.

75. The seventy-fifth part is a list of units.

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260. The two hundred-sixtieth part is a list of appendices.

Stages of EIS Evolution

<u>Stage</u>	<u>Timing</u>	<u>Description</u>
1. Before EIS Products	Before 1985	DSS through conventional software tools
2. First EIS Products	1985	Arrival of Command Center & Commander/EIS

INPUT

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Notes



Stages of EIS Evolution

<u>Stage</u>	<u>Timing</u>	<u>Description</u>
3. Graphical User Interface	1987	Power of PC captured Ease of use a reality
4. Alternative Platforms	1988	LANs, minis, and PCs

INPUT

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Notes

Stages of EIS Evolution

<u>Stage</u>	<u>Timing</u>	<u>Description</u>
5. Many Vendors in Market	1989- 1990	Many technical approaches become available
6. Information Pipeline	1991	Direct access to operational data bases

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INPUT

Notes



Stages of EIS Evolution

<u>Stage</u>	<u>Timing</u>	<u>Description</u>
7. Everyone's IS	1992-1995	EIS user interface spreads to traditional applications

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INPUT

Notes

EIS Definition—Tool Kit Components

<u>Component</u>	<u>Original</u>	<u>Current</u>	<u>Future</u>
Relational Data Bases	X	X	X
Character User Interface	X		
Graphical User Interface	X	X	X
Personal Use Tools		X	X
CASE-like Development Tools	X	X	

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INPUT

Notes



EIS Definition—Tool Kit Components

<u>Component</u>	<u>Original</u>	<u>Current</u>	<u>Future</u>
Direct Data Pipeline— Import & Export		X	X
Decision Support Tools			X
Text Management			X
Image Processing			X
			INPUT

SP-87

Notes



EIS Impacts on Applications Development

- Greater requirement for business knowledge
- User more/less capable of specifying requirements

SP-88

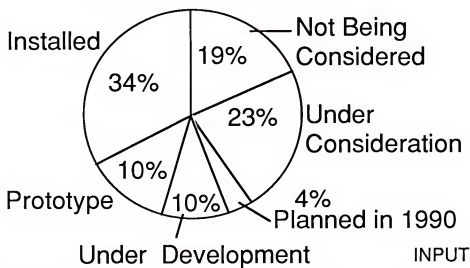
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Notes



EIS Activity and Status

Percent of Respondents

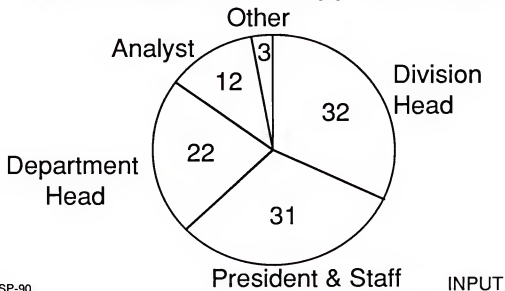


SP-89

Notes

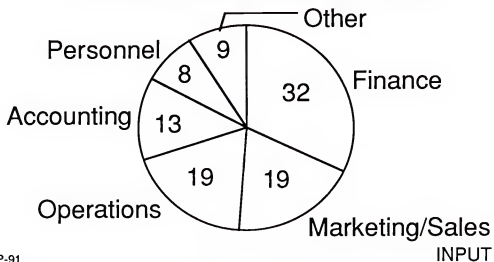


Who Uses EIS—Type of User



Notes

Who Uses EIS Functional Area of User

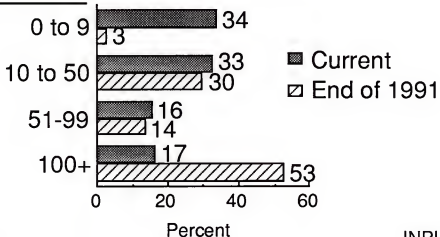


Notes



Size of EIS User Population

No. of Users



SP-92

INPUT

Notes

1. The first part of the report discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the success of any business and for the protection of the interests of all parties involved. The report also notes that accurate records are necessary for the preparation of financial statements and for the determination of the true financial position of the company.

2. The second part of the report deals with the various methods of record-keeping. It compares the different systems and discusses their respective advantages and disadvantages. The report concludes that the most effective system is one that is simple, efficient, and capable of providing the necessary information in a timely and accurate manner.

3. The third part of the report discusses the importance of the internal control system. It notes that a well-designed internal control system is essential for the prevention of fraud and for the protection of the company's assets. The report also discusses the various components of the internal control system and the role of each component in the overall system.

4. The fourth part of the report discusses the importance of the external control system. It notes that a well-designed external control system is essential for the protection of the company's reputation and for the maintenance of its relationships with its customers and suppliers. The report also discusses the various components of the external control system and the role of each component in the overall system.

5. The fifth part of the report discusses the importance of the legal control system. It notes that a well-designed legal control system is essential for the protection of the company's legal interests and for the maintenance of its compliance with the law. The report also discusses the various components of the legal control system and the role of each component in the overall system.

6. The sixth part of the report discusses the importance of the ethical control system. It notes that a well-designed ethical control system is essential for the protection of the company's ethical values and for the maintenance of its reputation. The report also discusses the various components of the ethical control system and the role of each component in the overall system.

7. The seventh part of the report discusses the importance of the environmental control system. It notes that a well-designed environmental control system is essential for the protection of the company's environmental interests and for the maintenance of its reputation. The report also discusses the various components of the environmental control system and the role of each component in the overall system.

8. The eighth part of the report discusses the importance of the social control system. It notes that a well-designed social control system is essential for the protection of the company's social interests and for the maintenance of its reputation. The report also discusses the various components of the social control system and the role of each component in the overall system.

9. The ninth part of the report discusses the importance of the economic control system. It notes that a well-designed economic control system is essential for the protection of the company's economic interests and for the maintenance of its reputation. The report also discusses the various components of the economic control system and the role of each component in the overall system.

10. The tenth part of the report discusses the importance of the political control system. It notes that a well-designed political control system is essential for the protection of the company's political interests and for the maintenance of its reputation. The report also discusses the various components of the political control system and the role of each component in the overall system.

EIS Sub-Applications Active and Planned

Application	% Act. 1990	% to be Act.—1991
Board Material	23	49
Monthly Reports	58	90
Weekly Reports	38	77
Daily Reports	35	72

SP-93

INPUT

Notes

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study.

2. The second part of the report is a detailed description of the study area. It includes information about the location of the study area, the population of the study area, and the characteristics of the study area.

3. The third part of the report is a description of the data collection process. It includes information about the sources of data, the methods used to collect data, and the time period over which data was collected.

4. The fourth part of the report is a description of the data analysis process. It includes information about the statistical methods used to analyze the data and the results of the analysis.

5. The fifth part of the report is a conclusion and discussion of the findings of the study. It discusses the implications of the findings and provides recommendations for future research.

6. The sixth part of the report is a list of references. It includes a list of all the sources of information used in the study.

7. The seventh part of the report is an appendix. It includes any additional information that is relevant to the study but is not included in the main body of the report.

8. The eighth part of the report is a glossary. It includes definitions of all the terms used in the report.

9. The ninth part of the report is a list of figures and tables. It includes a list of all the figures and tables included in the report.

10. The tenth part of the report is a list of abbreviations. It includes a list of all the abbreviations used in the report.

EIS Sub-Applications Active and Planned

Application	% Act. 1990	% to be Act.—1991
E-Mail	38	70
Calendar	27	58
Note, To-Do Lists	17	47
External News Svc.	35	65

SP-94

INPUT

Notes

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the research and the objectives of the study.

2. The second part of the report is a detailed description of the methodology used in the study. It includes information about the sample size, the data collection methods, and the statistical analysis techniques.

3. The third part of the report is a presentation of the results of the study. It includes tables, figures, and text describing the findings.

4. The fourth part of the report is a discussion of the results and their implications. It discusses the strengths and limitations of the study and provides suggestions for future research.

5. The fifth part of the report is a conclusion. It summarizes the main findings of the study and provides a final statement on the research.

6. The sixth part of the report is a list of references. It includes all the sources used in the study.

7. The seventh part of the report is an appendix. It includes any additional information that is relevant to the study.

8. The eighth part of the report is a glossary. It includes definitions of the key terms used in the study.

9. The ninth part of the report is a bibliography. It includes all the sources used in the study.

10. The tenth part of the report is a list of figures. It includes all the figures used in the study.

EIS Data Categories Active and Planned

Application	% Act. 1990	% to be Act.—1991
Financial	55	97
Accounting	33	65
Marketing/Sales	45	84

SP-95

INPUT

Notes



Figure 1. A schematic diagram of the experimental setup. The diagram shows a rectangular frame with several labels and lines. The labels are arranged in a grid-like fashion, possibly representing a coordinate system or a data table. The lines are thin and light, suggesting they might be part of a larger diagram or a placeholder for a figure.

EIS Data Categories Active and Planned

Application	% Act. 1990	% to be Act.—1991
Operating	41	76
Personnel	26	56
Engineering	4	8

SP-96

INPUT

Notes

12/18/90



EIS—Ranking of Sponsor's Goals

<u>Goal</u>	<u>Percent</u>
Timeliness	20
Quality of Data	16
Mgmt Process	13
Use of Technology	11

SP-97

INPUT

Notes

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research. It also provides a brief overview of the methodology used in the study.

2. The second part of the report is a detailed description of the study area. It includes information about the location of the study area, the population of the study area, and the characteristics of the study area. It also discusses the data sources used in the study.

3. The third part of the report is a detailed description of the study results. It includes information about the findings of the study, the conclusions drawn from the findings, and the implications of the findings. It also discusses the limitations of the study and the need for further research.

4. The fourth part of the report is a conclusion and recommendations section. It summarizes the main findings of the study and provides recommendations for future research and policy. It also discusses the significance of the study and the contribution it has made to the field.

5. The fifth part of the report is a list of references. It includes a list of all the sources used in the study, including books, articles, and other documents. It also includes a list of all the authors who have contributed to the study.

6. The sixth part of the report is an appendix. It includes a list of all the data used in the study, including raw data and processed data. It also includes a list of all the figures and tables used in the study.

7. The seventh part of the report is a glossary. It includes a list of all the terms used in the study, including technical terms and common terms. It also includes a list of all the abbreviations used in the study.

8. The eighth part of the report is a list of all the pages in the report. It includes a list of all the pages in the report, including the title page, the table of contents, and the list of references.

9. The ninth part of the report is a list of all the figures and tables in the report. It includes a list of all the figures and tables in the report, including the title page, the table of contents, and the list of references.

10. The tenth part of the report is a list of all the authors who have contributed to the study. It includes a list of all the authors who have contributed to the study, including the main author and the co-authors.

EIS—Ranking of Sponsor's Goals

<u>Goal</u>	<u>Percent</u>
Reduce Paper Flow	11
Flexible Data Access	11
Same Information to All	8
Other	10

SP-98

INPUT

Notes

1. The first part of the report is a general introduction to the subject.

2. The second part is a detailed description of the methods used.

3. The third part is a discussion of the results obtained.

4. The fourth part is a conclusion and summary of the work.

5. The fifth part is a list of references.

6. The sixth part is a list of figures.

7. The seventh part is a list of tables.

8. The eighth part is a list of appendices.

9. The ninth part is a list of footnotes.

10. The tenth part is a list of errata.

11. The eleventh part is a list of acknowledgments.

12. The twelfth part is a list of dedications.

13. The thirteenth part is a list of prefaces.

14. The fourteenth part is a list of contents.

15. The fifteenth part is a list of indexes.

16. The sixteenth part is a list of glossaries.

17. The seventeenth part is a list of abbreviations.

18. The eighteenth part is a list of symbols.

19. The nineteenth part is a list of units.

20. The twentieth part is a list of conventions.

21. The twenty-first part is a list of notations.

22. The twenty-second part is a list of definitions.

23. The twenty-third part is a list of examples.

24. The twenty-fourth part is a list of exercises.

25. The twenty-fifth part is a list of problems.

26. The twenty-sixth part is a list of questions.

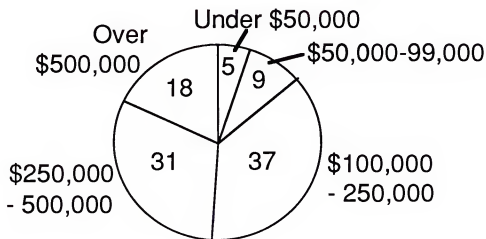
27. The twenty-seventh part is a list of answers.

28. The twenty-eighth part is a list of solutions.

29. The twenty-ninth part is a list of results.

30. The thirtieth part is a list of conclusions.

Cost of EIS—Initial Investment



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INPUT

Notes

12/18/90

EIS

The Vendor View

SP-100

INPUT

Notes

12/18/90

EIS Market Structure Services Strategy Comparison

Solution Vendors

Comshare

Execucom

IBM

Product Vendor

American Information
Systems

Decision Technologies

Holistic Systems

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INPUT

Notes



Fig. 1. The structure of the model.

EIS Market Structure Services Strategy Comparison

Solution Vendors

Information Resources
Pilot

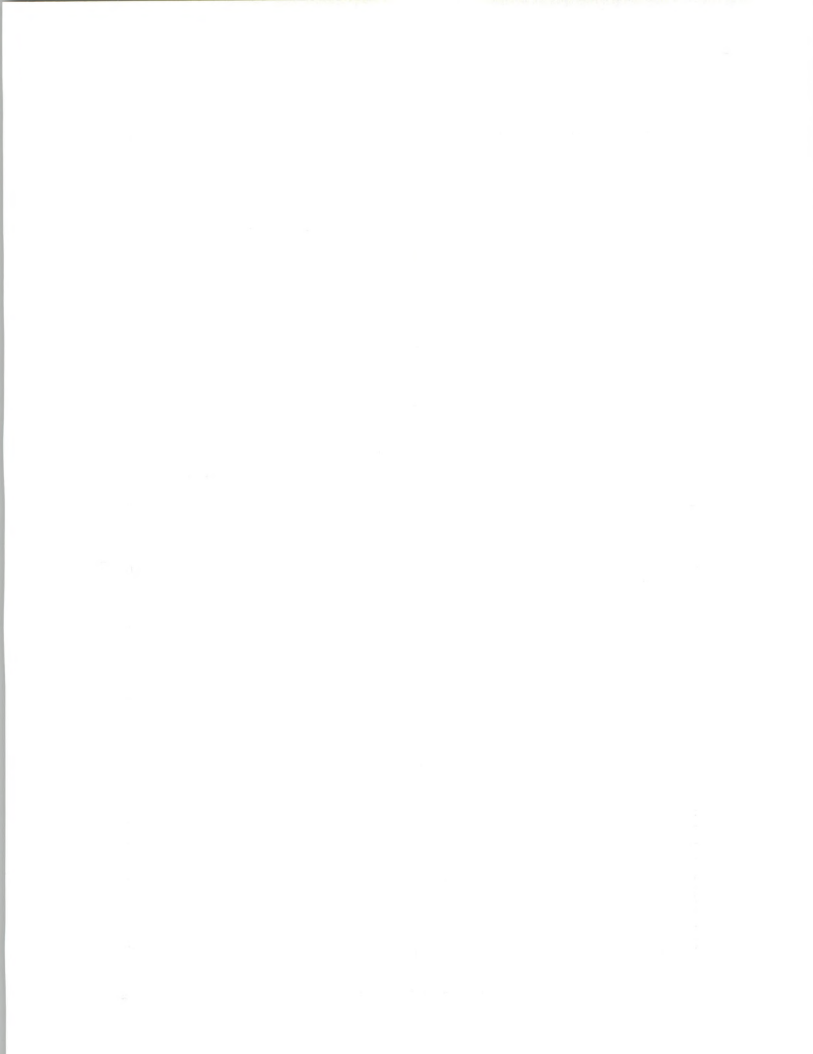
Product Vendor

Information Builders
Interactive Images
Media Works
SAS Institute

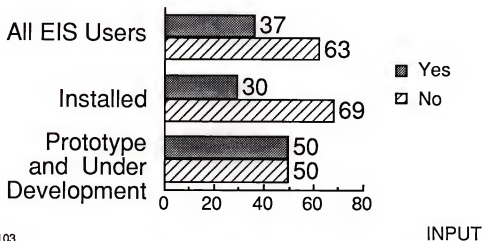
SP-102

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Notes



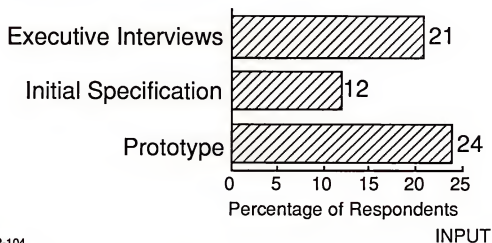
Professional Services Involvement in EIS Using Professional Services



Notes



Professional Services Involvement in EIS Performing Development Tasks

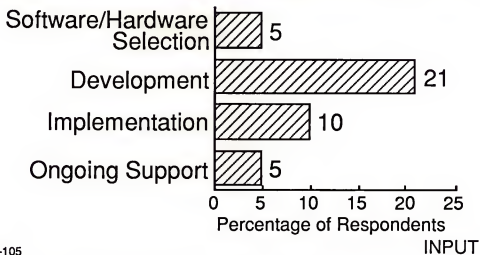


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Notes



Professional Services Involvement in EIS Performing Development Tasks



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Notes



EIS Technology Trends

- Expanding platforms and the LAN alternative
- Presentation versus analysis capabilities
- Direct data access
- Text and image processing capabilities
- Object-oriented computing

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INPUT

Notes



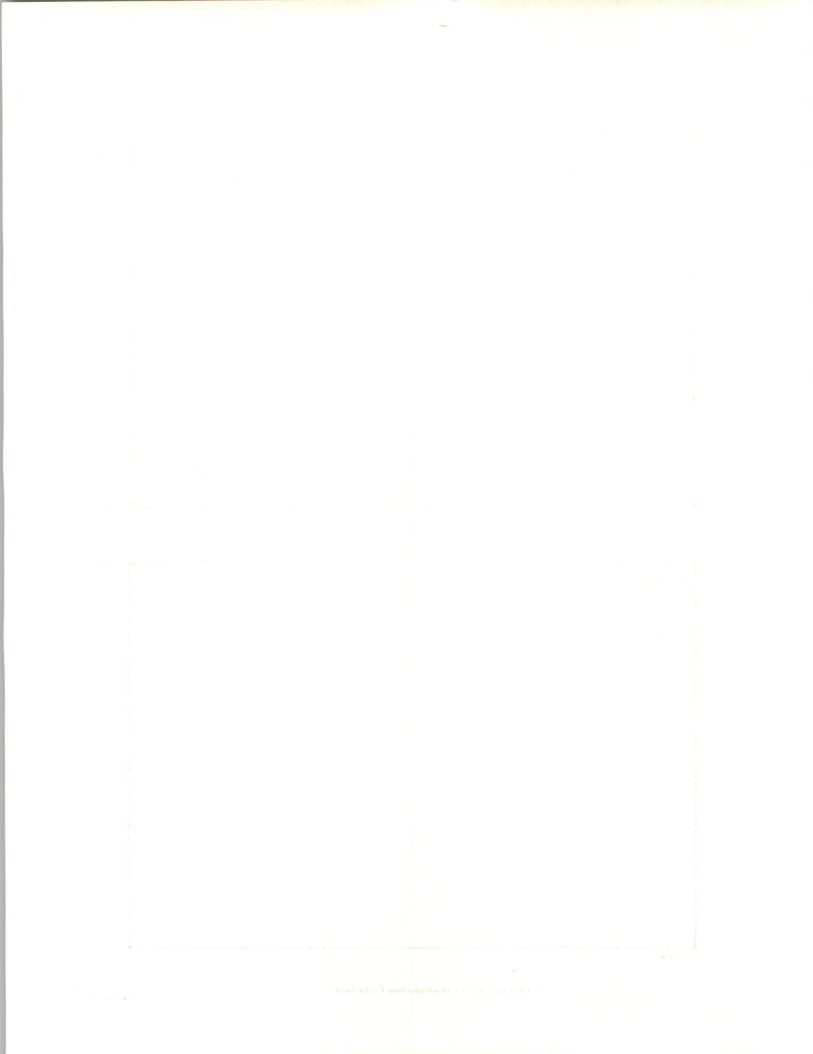
EIS Vendor Competitive Issues

- Technical flexibility
- Data access capabilities
- Decision support systems link
- Object orientation

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INPUT

Notes



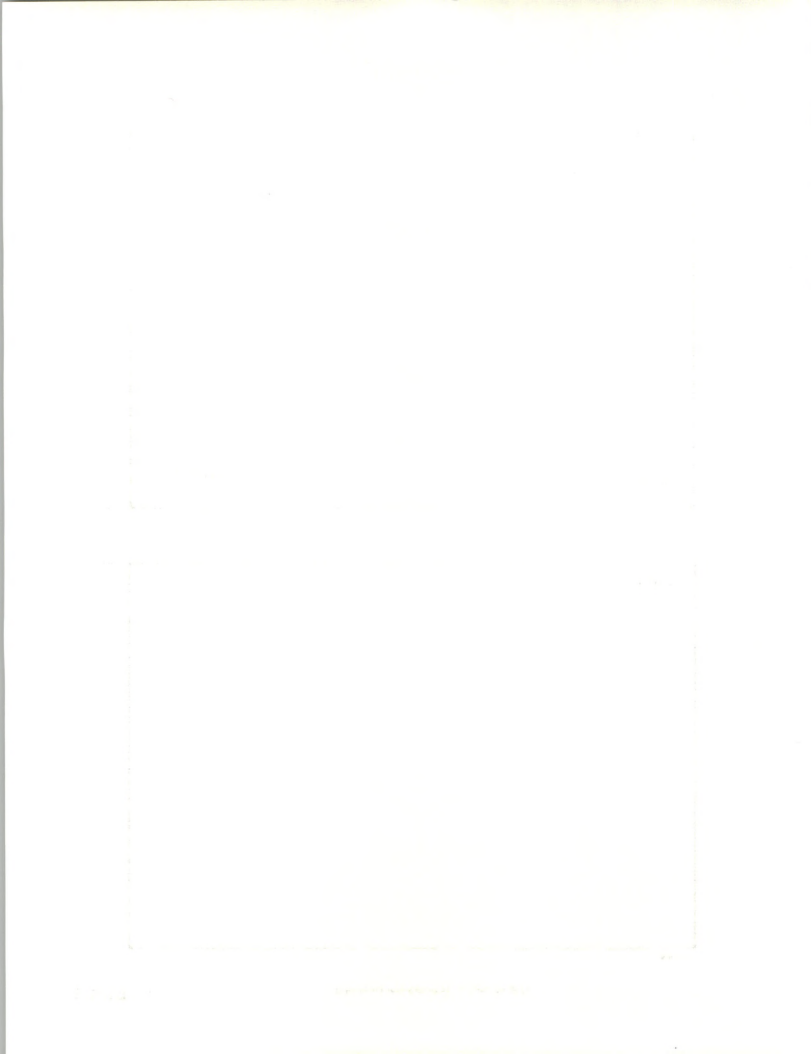
EIS Vendor Competitive Issues

- Fitting into the internal IS network
- Broadening the EIS audience
- User-specific applications
(e.g., human resources)

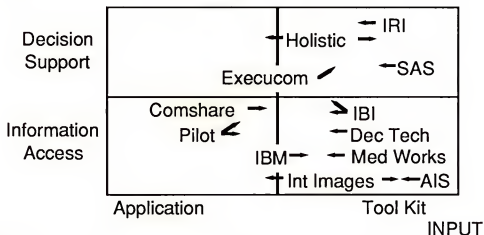
SP-108

INPUT

Notes



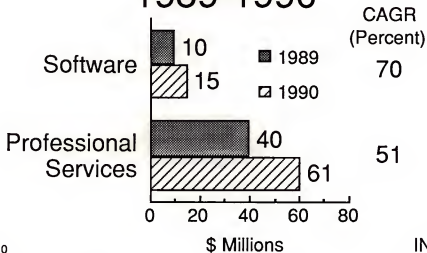
EIS Software Vendors Classification and Direction



Notes



EIS Market Growth 1989-1990



SP-110

Notes



EIS Market Forecast

Key Factors

- Expanding vendor community
- Growing penetration within user community
- Decreasing entry price

SP-111

INPUT

Notes



EIS Market Forecast

Key Factors

- Expansion beyond the executive user market
- Expansion into medium-sized firms
- Blurring of the EIS identity

SP-112

INPUT

Notes

12/18/90



EIS Conclusions

- An example for cooperative processing
- A tool kit, not an application
- An ideal user of LANs
- Differs from traditional development
- Creates strong link between user and IS
- Build EIS a piece at a time

SP-113

INPUT

Notes



EIS Impacts on Applications Development

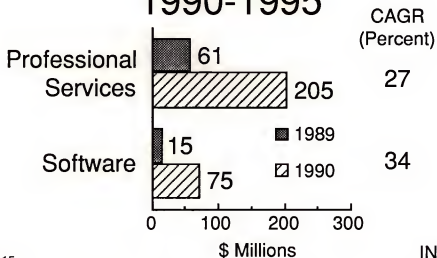
- Prototype a must, may be the real system
- Success means constant modification
- Supporting systems will also change
- Be ready for the politics

SP-114

INPUT

Notes

EIS Market Forecast 1990-1995



SP-115

Notes



Applications Software Products

SP-116

Notes



Applications Software Products

Driving Forces

- New technologies
- New products
- Customer emphasis on productivity improvements
- Pent-up demand for new products

SP-117

Notes



Applications Software Products

Growth Inhibitors

- Maturity of traditional products
- Slowdown in hardware sales
- New products still being developed
- Customer confusion

SP-118

Notes



Applications Software Products

Shifting Technology Foundation

- Standards
- Downsizing and client/server
- Networking and integration
- Distributed data

SP-119a

Notes



Applications Software Products

Shifting Technology Foundation

- Graphical user interface
- Imaging
- Engineered/re-engineering software

SP-119b

Notes



Applications Software Products

Vendor Issues

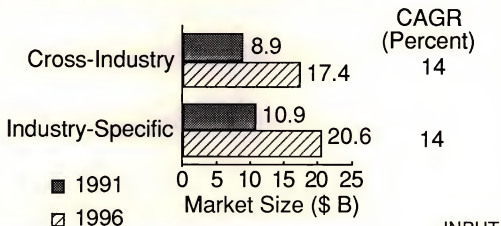
- More power to the customer
- Choosing product directions
- How to get new products to market fast
- Product migration strategies
- New pricing strategies

SP-120

Notes



U.S. Applications Software Products Market, 1991-1996



SP-121

Notes



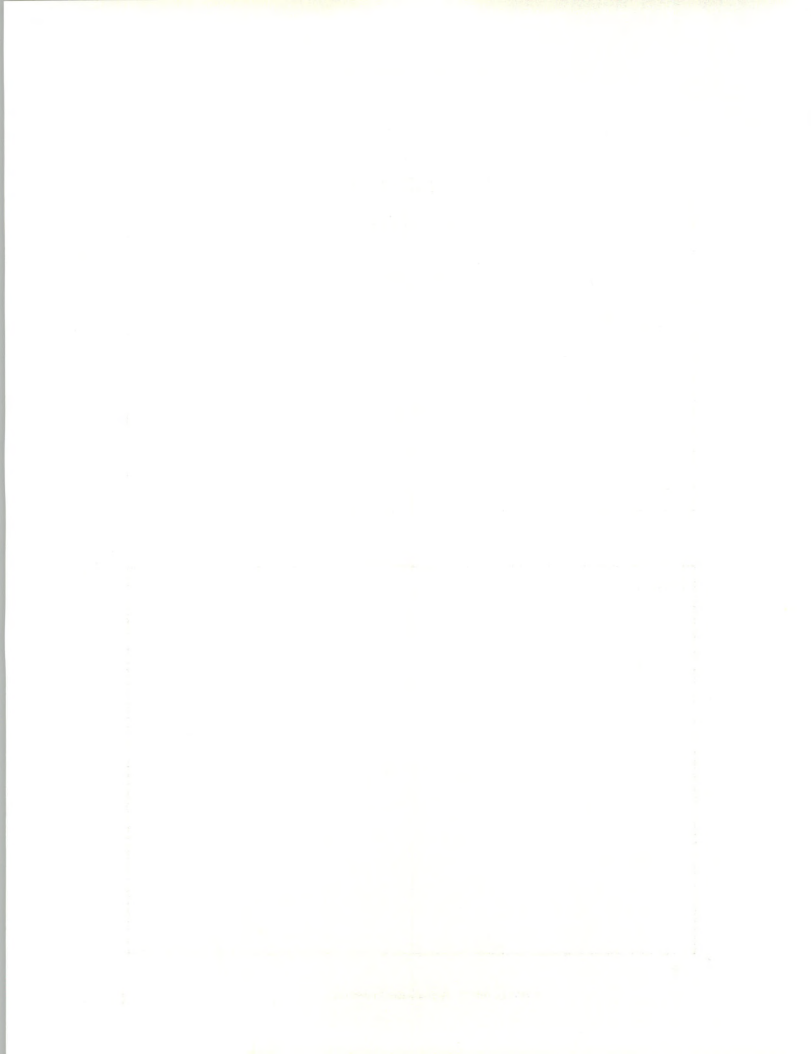
Shifting Technology Foundation

- UNIX, open systems and portability
- OS/2 workstation-based applications
- Object-oriented software development

SP-123

INPUT

Notes



Application Software Products Changing Buying Patterns

- Make versus buy decisions
- Solutions versus products
- A more strategic purchase
- End-user involvement and role of operating executives

SP-124

INPUT

Notes



Application Software Products Changing Distribution Channels

- SI and SO
- Applications software versus turnkey
- Turnkey/VAR versus systems integration

SP-125

INPUT

Notes



Application Software Products Changing Distribution Channels

- National versus regional VARs
- Importance of alliances
- Channel conflict

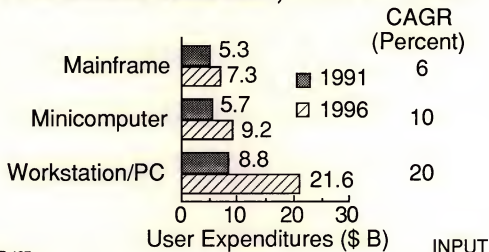
SP-126

INPUT

Notes



Applications Software Products Market, 1991-1996



Notes



Applications Software Products

Major Vendors, 1990

Company Name	Market Share (%)
IBM	4
Dun & Bradstreet Corp.	2
Lotus Development Corp.	2
Microsoft	2

SP-128

Notes



Applications Software Products

Major Vendors, 1990

Company Name	Market Share (%)
WordPerfect	2
Computer Associates	1
Groupe Bull	1

SP-129

Notes

The use of the word "and" in the title of the paper is a mistake. It should be "or" or "and/or".



Major Vendors' UNIX Commitment

	Before 1990	After 1990
NCR	High	Full
DEC	Low	High
Computer Assoc.	Low	High

SP-130

Notes



Major Vendors' UNIX Commitment

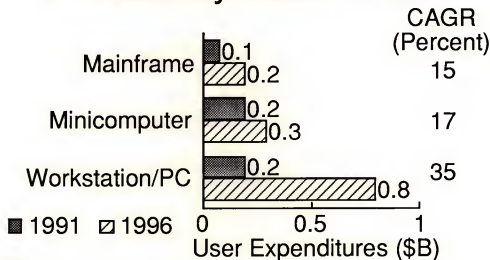
	Before 1990	After 1990
Microsoft	Low	Medium
Unisys	Low	Medium

SP-131

Notes



U.S. UNIX Operating Systems Forecast by Platform Size



SP-134

Notes



UNIX Market Drivers

- UNIX advantages
- Level of vendor endorsement and product availability
- User demand for UNIX

SP-135

INPUT

Notes



Level of Vendor Endorsement and Product Activity

- Applications software products needed
- Distribution and support infrastructure needed

SP-138

INPUT

Notes



User Demand for UNIX

- Increasing development complexity/backlog
- Inefficient islands of technology
- Unmet needs/“upsizing”
- Knowledge about UNIX

SP-139

INPUT

Notes



Users: Successes with UNIX

- Applications development efforts
- Easily portable
- Support of remote sites

SP-141

INPUT

Notes



Advantages of Current Operating System Over UNIX

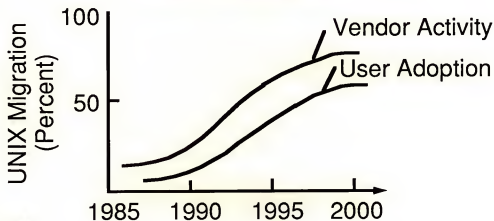
- Support current software selections
- Runs on existing hardware
- Everyone knows it
- Straightforward operating system

SP-144

INPUT

Notes

UNIX Vendor Activity and User Adoption



SP-147

Notes

UNIX Vendor Recommendations

- Operations management products needed
- Prepare direct sales forces for UNIX

SP-150

INPUT

Notes



UNIX Vendor Recommendations

- Systems integration and professional services needed
- Specialized UNIX vendors prepare for the long haul

SP-151

INPUT

Notes



Systems Software Products

Key Issues

- Growing need to share data and applications
- Need to combine new and existing technologies

SP-152

INPUT

Notes

7/30/91

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the company's financial health and for providing reliable information to stakeholders.

2. The second part of the document outlines the specific procedures for recording transactions. It details the steps involved in the accounting process, from identifying transactions to posting them to the general ledger.

3. The third part of the document discusses the role of the accounting department in ensuring the accuracy of the financial statements. It highlights the importance of regular audits and the need for transparency in the reporting process.

4. The fourth part of the document provides a summary of the key points discussed in the previous sections. It reiterates the importance of accurate record-keeping and the need for strict adherence to the established procedures.

5. The fifth part of the document discusses the challenges faced by the accounting department in maintaining accurate records. It identifies common pitfalls and provides strategies for avoiding them.

6. The sixth part of the document discusses the future of accounting and the role of technology in the field. It highlights the importance of staying up-to-date with the latest developments in the industry.

7. The seventh part of the document provides a conclusion and a call to action. It encourages the accounting department to continue to strive for accuracy and transparency in all of its transactions.

8. The eighth part of the document provides a list of references and a bibliography. It includes a list of books, articles, and other sources that were consulted during the research process.

Systems Software Products

Key Issues

- Need to improve productivity of software development
- Growing complexity of managing enterprisewide systems

SP-153

INPUT

Notes



Systems Software Products

Key Trends

- Cooperative/distributed processing evolution
- Slow migration to standards
- New growth for network management and data center automation

SP-154

INPUT

Notes

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text outlines the various methods used to collect and analyze data, including the use of statistical models and computerized databases. It also mentions the role of the audit committee in overseeing the process and ensuring that all procedures are followed correctly.

2. The second part of the document focuses on the specific steps involved in the audit process. It begins with the selection of the audit team, which is composed of individuals with diverse backgrounds and expertise. The team then conducts a thorough review of the company's financial statements, looking for any discrepancies or irregularities. This is followed by a detailed examination of the underlying transactions and supporting documentation. The audit team also interviews key personnel to gain a better understanding of the company's operations and internal controls.

3. The third part of the document discusses the final stages of the audit process, including the preparation of the audit report and the communication of findings to the relevant stakeholders. The report provides a clear and concise summary of the audit results, highlighting any areas of concern and recommending appropriate corrective actions. The findings are then presented to the audit committee, which makes a final decision on the overall outcome of the audit. The document concludes by emphasizing the importance of transparency and accountability in the financial reporting process.

4. The fourth part of the document provides a detailed overview of the various types of financial statements that are typically audited. It includes a discussion of the balance sheet, income statement, and cash flow statement, as well as the statement of equity. Each statement is described in terms of its purpose and the information it provides. The text also explains how these statements are prepared and how they are used by investors and other stakeholders to make informed decisions. It mentions the importance of ensuring that these statements are accurate and reliable, which is why they are subject to audit.

5. The fifth part of the document discusses the various risks associated with financial reporting and the steps that can be taken to mitigate these risks. It identifies the most common types of errors and frauds that can occur, such as misstatements, omissions, and manipulations. It also discusses the role of internal controls in preventing these risks and the importance of regular monitoring and evaluation of these controls. The text concludes by emphasizing the need for a strong corporate governance framework to ensure the integrity of the financial reporting process.

Systems Software Products

Key Trends

- Slow adoption of CASE
- RDBMS in infancy, from user standpoint
- Graphical user interfaces just beginning to take off

SP-155

INPUT

Notes



Systems Software Products

Key Trends

- Widespread use of object-oriented programming and expert systems a long way off
- Emergence of voice processing
- Initial acceptance of image processing

SP-156

INPUT

Notes



Systems Software Products

SP-157

INPUT

Notes



Systems Software Products Driving Forces

- Slowed economy
- Downsizing and client-server
- UNIX and software frameworks
- Integration/interoperability efforts
- Emphasis on solutions

SP-158

INPUT

Notes



Systems Software Products

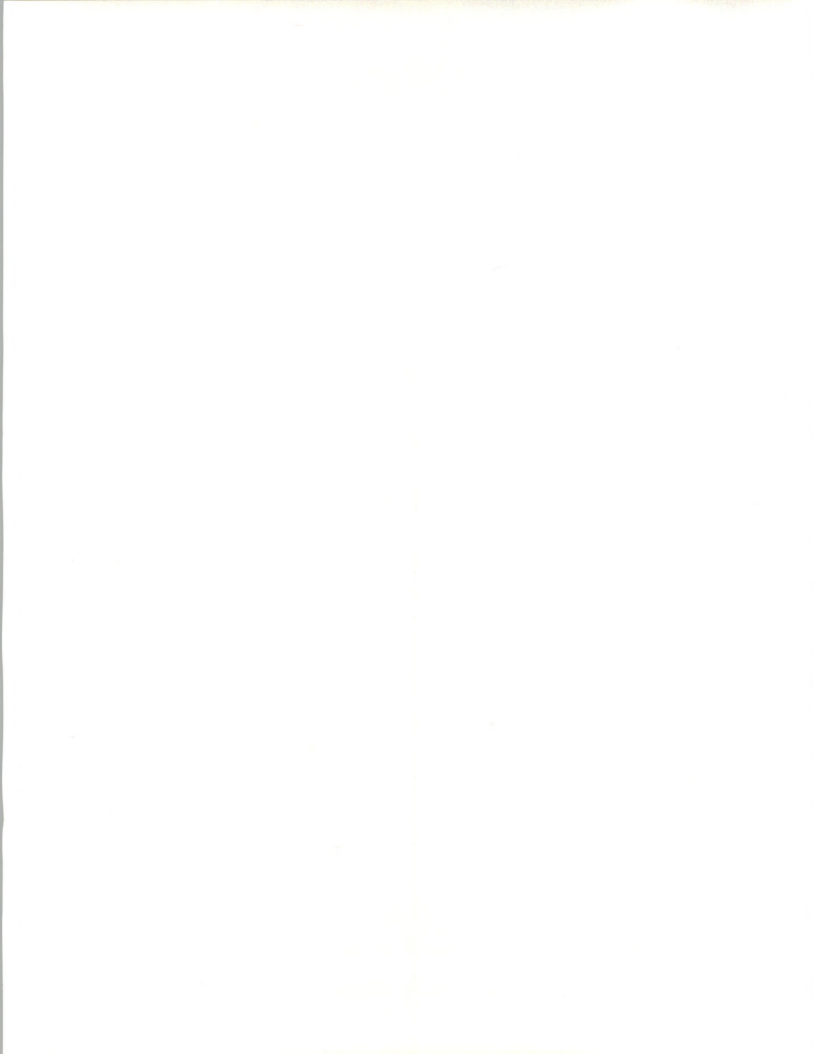
Key User Issues

- Enterprise-wide computing
- Data accessibility
- More operations management products
- More useful applications development products
- Provision of support and education

SP-159

INPUT

Notes



Information Systems Environment Systems Software Findings

- Data center infrastructure intact
- LAN integration a high priority
- “Wait and see” on client-server
- Expenditures on systems control products the highest

SP-160a

INPUT

Notes



Information Systems Environment Systems Software Findings

- Mainframes still prevail
- 78% of budget for maintenance
- More operations management tools needed
- More support needed

SP-160b

INPUT

Notes



Applications Software Products

User Survey

- 24% budget increase for 1992
- Mainframe-based spending declining; workstation/PC-based spending increasing
- More cross-industry spending

SP-165a

INPUT

Notes



Applications Software Products

User Survey

- Low level of interest in customization
- Large applications development efforts persist
- UNIX a low priority

SP-165b

Notes



Applications Software Products

User Survey

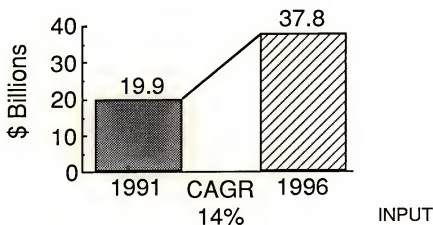
- More functionality and features desired
- A variety of vendors preferred
- A variety of technology goals and approaches

SP-165c

Notes



Applications Software Products Market, 1991-1996



SP-168

Notes



U.S. Applications Software Products

Vertical Sectors

Largest	Fastest Growing
Banking and Fin.	Telecommunications
Discrete Mfg.	Retail
Medical	Federal Gov't.
Insurance	Business Services
Education	

SP-170

INPUT

Notes



U.S. Applications Software Products

Cross-Industry Sectors

Largest	Fastest Growing
Office Systems	Educ. and Training
Planning and Anal.	Eng. and Scientific
Accounting	

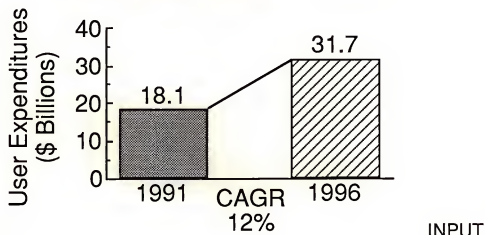
SP-171

INPUT

Notes



Systems Software Products Market, 1991-1996



SP-173

Notes



Systems Software Products

Client/Server in Infancy

- Lack of a common definition
- Lack of product models
- Rewrites of current applications required
- Lack of distributed RDBMS standards

SP-175

INPUT

Notes



Systems Software Products

Vendor Frameworks

- SAA
- NAS
- CA90s

SP-176

INPUT

Notes



Systems Software Products

Vendor Issues

- Technology challenges
- Standards vs. differentiation
- New pricing strategies
- Declining hardware sales
- Slowed software growth
- Acquisition vs. alliance

SP-177

INPUT

Notes



Software Changing from a Product to a Service

SP-178

INPUT

Notes



Support?
or
Services?
or
Support Services?

SP-179

INPUT

Notes



Support

- Maintenance
- Training (multilevel)
- Documentation
- Clarification (hotline)

SP-180

INPUT

Notes



Services

- Education
- Enhancement
- Logistics
- Optimization
- Consulting
- Customization
- Installation/conversion
- Customer interaction

SP-181

INPUT

Notes



Characteristics of Service

- Recurring revenues
- Continuous use
- Pay by use

SP-182

INPUT

Notes



U.S. Software Market Trends

- Targets
 - 1970s, products
 - 1980s, support
 - 1990s, services/solutions

SP-183

INPUT

Notes



U.S. Software Market Trends

- Away from standard
 - Towards uniqueness
- Supported by standards

SP-184

INPUT

Notes



Worldwide Software Products Markets

	1990	1995
Total	60	125

Market Size (\$ Billion)

SP-185

INPUT

Notes



U.S. Software Products Markets

	1990	1995
Applications	18	35
Systems	16	31

Market Size (\$ Billion)

SP-186

INPUT

Notes



Software Support Markets Europe

	1989	1994
Systems Products	13	20
Applications Products	12	16

Proportion of Market (Percent)

INPUT

SP-187

Notes



Software Support Markets U.S.

	1989	1994
Systems	23	25
Products		
Applications	15	20
Products		

Proportion of Market (Percent)

SP-188

INPUT

Notes



Problem Identification

- 63% “no problems”
- Response time
- Repair and fix times
- Software performance and functionality

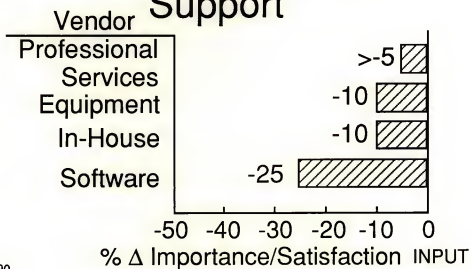
SP-189

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Notes



User Perception Application Support

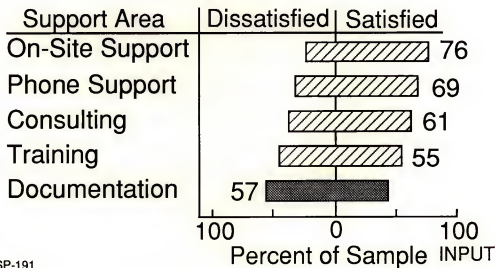


SP-190

Notes



Software Support Satisfaction by Support Area



SP-191

Notes



Software Support Ratings

Offering	User Rating *	Vendor Rating *
Centralized support	3.1	4.5
Free training	2.6	4.2
Purchased training	2.0	3.9
Custom software	2.1	4.2

* 1 = Least Value; 5 = Greatest Value

SP-192

INPUT

Notes



Software Support Ratings

Offering	User Rating *	Vendor Rating *
Consulting	2.7	3.8
S/W fixes	3.3	4.6
Upgrades	3.6	4.5

* 1 = Least Value; 5 = Greatest Value

SP-193

INPUT

Notes



User Training Requirements

- Increase
 - 47% of respondents
 - Software complexity/sophistication
 - Lack of in-house time or skills
 - Introduce new users

SP-194

INPUT

Notes



User Training Requirements

- Remain the same
 - 36% of respondents
 - In-house support supplement
 - Third-party providers

SP-195

INPUT

Notes



User Training Requirements

- Decrease
 - 17% of respondents
 - Better documentation
 - Software user-friendly qualities
 - Market training products
 - Third-party providers

SP-196

INPUT

Notes



Services and Product Markets Blurring

- Professional services use of
 - CASE
 - Kernels

SP-197

INPUT

Notes



Technology Application to Software Support/Services

- Networks
- Parallel view
- Expert systems
- Embedded documentation
- Embedded training
- Data/information bases

SP-198

INPUT

Notes



Technology Application to Software Support/Services

- Embedded software
- Voice services
 - 800 numbers
 - 900 numbers
- Image/fax services
- Remote printing

SP-199

INPUT

Notes



Contact Trends

- Bulletin boards
- Newsletters (electronic and paper)
- User meetings (electronic and physical)

SP-200

INPUT

Notes



Support Pricing

- 'Bundling' with licenses
- 'Bundling' with systems maintenance

SP-201

INPUT

Notes



Keys to Success

- Use of technology
- Pricing
- Customer sensitivity
- Services (solution) orientation
- Standards

SP-202

INPUT

Notes



Customer Satisfaction

- Proactive not reactive
- Timely (event driven)
- Objective

SP-203

INPUT

Notes

Proactive vs Reactive

SP-204

INPUT

Notes

1. The first part of the paper is devoted to the study of the properties of the function $f(x)$ defined by the equation

$$f(x) = \int_0^x \frac{1}{1+t^2} dt, \quad (1)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

2. In the second part, we consider the function $g(x)$ defined by the equation

$$g(x) = \int_0^x \frac{1}{1+t^4} dt, \quad (2)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

3. In the third part, we consider the function $h(x)$ defined by the equation

$$h(x) = \int_0^x \frac{1}{1+t^6} dt, \quad (3)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

4. In the fourth part, we consider the function $k(x)$ defined by the equation

$$k(x) = \int_0^x \frac{1}{1+t^8} dt, \quad (4)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

5. In the fifth part, we consider the function $l(x)$ defined by the equation

$$l(x) = \int_0^x \frac{1}{1+t^{10}} dt, \quad (5)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

6. In the sixth part, we consider the function $m(x)$ defined by the equation

$$m(x) = \int_0^x \frac{1}{1+t^{12}} dt, \quad (6)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

7. In the seventh part, we consider the function $n(x)$ defined by the equation

$$n(x) = \int_0^x \frac{1}{1+t^{14}} dt, \quad (7)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

8. In the eighth part, we consider the function $o(x)$ defined by the equation

$$o(x) = \int_0^x \frac{1}{1+t^{16}} dt, \quad (8)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

9. In the ninth part, we consider the function $p(x)$ defined by the equation

$$p(x) = \int_0^x \frac{1}{1+t^{18}} dt, \quad (9)$$

where x is a real number. It is well known that this function is increasing and concave down on the interval $(-\infty, \infty)$.

10. In the tenth part, we consider the function $q(x)$ defined by the equation

$$q(x) = \int_0^x \frac{1}{1+t^{20}} dt, \quad (10)$$

Futures

- Embedded diagnostics
- Problem/use data bases
- Expert system resolution
- CBT

SP-205

INPUT

Notes

Systems Software Products

Systems
Control

Operations
Management

Applications
Development

SP-206

INPUT

Notes



Applications Software Products

Mainframe

Minicomputer

PC/Workstation

15 Industry and 7 Cross Industry Sectors

SP-207

INPUT

Notes

UNIX

Market Status

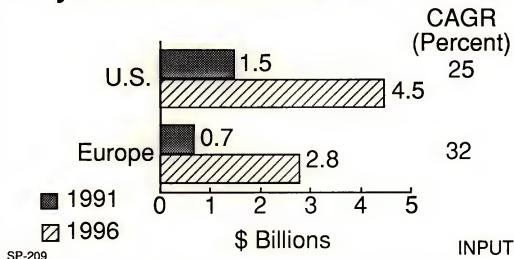
SP-208

INPUT

Notes



UNIX—Market Size Systems Software Products



Notes



UNIX—Market Growth Systems Software Products

	91-96 CAGR (%)		% of Market	
	Total	UNIX	1991	1996
U.S.	12	25	8	14
Europe	11	32	6	13

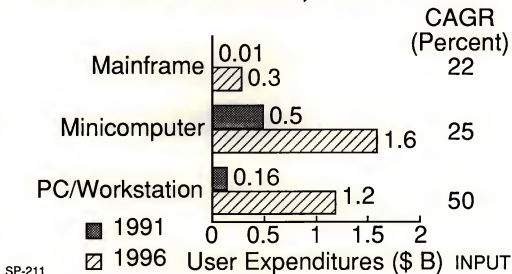
SP-210

INPUT

Notes



European UNIX Systems Software Market, 1991-1996



Notes



UNIX Market Shapers

User Demands

User Demands vs. Vendor Responses

- Better value = More competition
- Protection = More portability
- Productivity = Tools and skills pool
- Flexibility = Federated solutions
- Packages = Scalable choices

INPUT

SP-212

Notes



UNIX Disadvantages

- No single vender owns UNIX
- Incomplete—many add-ons required
- Interconnectivity with proprietary environments

SP-213

INPUT

Notes



Client/Server

SP-214

INPUT

Notes

Client/Server

Driving Forces

- Consistent with new IS goals
- Responds to change in business structure
- Facilitates re-engineering
- Apparent cost and control advantages

INPUT

SP-215

Notes



Client/Server

Growth Inhibitors

- Immature technology
- New IT learning curve
- Uncertainty about cost savings
- Natural resistance to change
- Investment in current systems

INPUT

SP-216

Notes



Client/Server

Software Products Vendors Product Strategy

Client

Server

Application Functionality



PeopleSoft

D&B

Fourth Shift

Sybase

ASK/Ingres

SP-217

INPUT

Notes



Client/Server

U.S. Market Size Likely Scenario

Component	1992	1997	CAGR (%)
Computer Equipment	9.2	26.0	40
Software Products	2.8	14.5	40
Information Services	1.4	7.5	23
Total	13.4	48.0	30

SP-218

INPUT

Notes



Client/Server

Growth Outlook Comparison

Component	Client/Serv. CAGR (%)	Total Market CAGR (%)
Computer Equipment	40	2
Software Products	40	12
Information Services	23	13
Total	30	9

SP-219

INPUT

Notes



Client/Server

Application Examples

Organization	Application
Food processor	Warehouse automation
Shipping firm	Financial accounting
Aircraft manufacturer	Semiconductor testing

SP-220

INPUT

Notes



Client/Server

Application Examples

Organization	Application
City school system	Student records system
Bank-capital markets	Financial inst. mgmt.
Oil & gas exploration	Reservoir simulation
Chemical processor	Prod. quality mgmt.

SP-221

INPUT

Notes

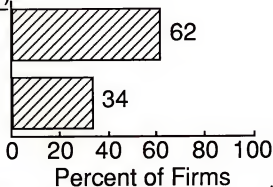


User Departments with More Applications Decision Making Than IS

Size (Revenues)

Over \$1 Billion

\$500 M - \$1 B

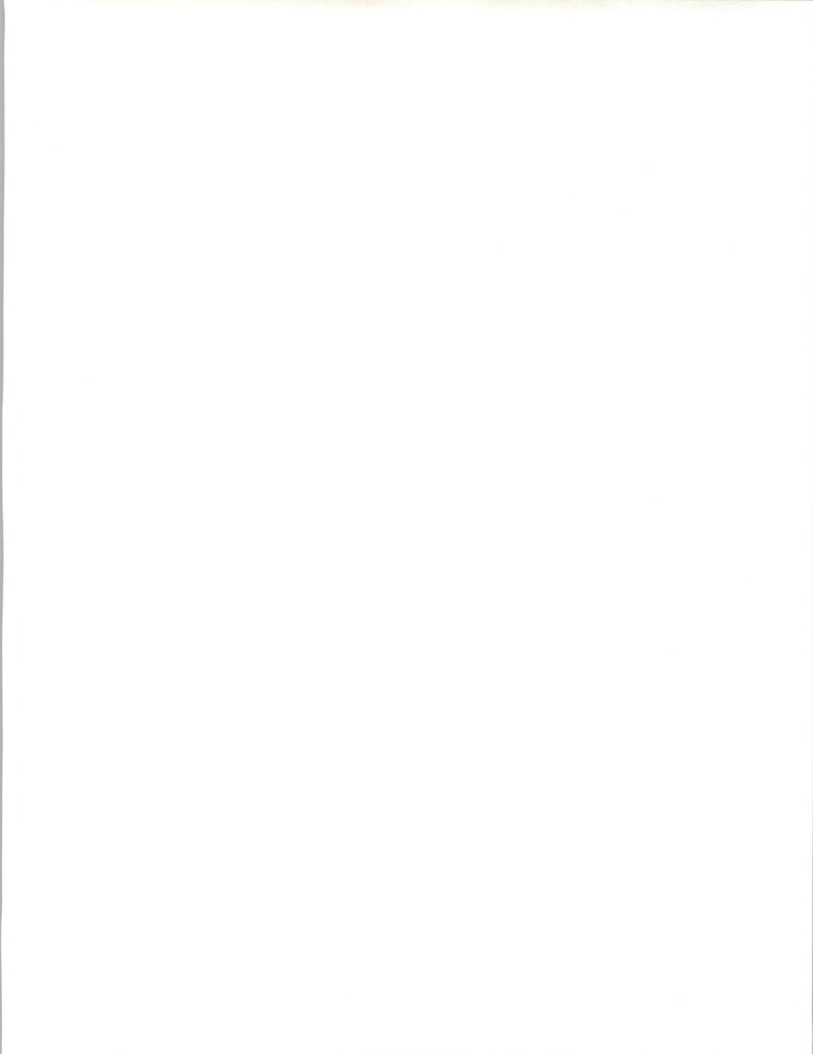


SP-222

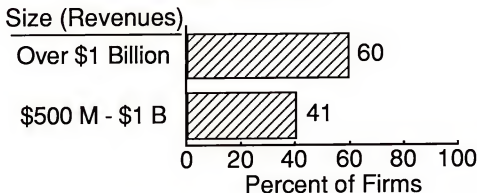
Source: Interviews with 67 IS departments

INPUT

Notes



Technology Change Accelerating Applications Replacement

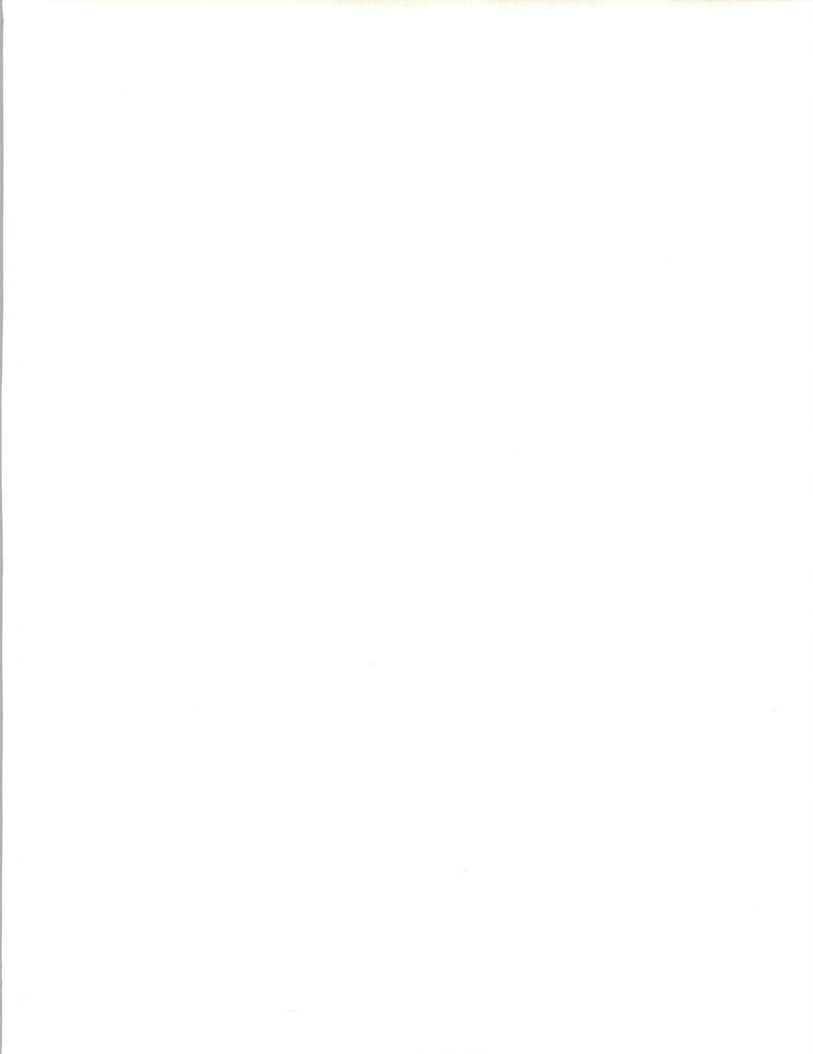


SP-223

Source: Interviews with 67 IS departments

INPUT

Notes



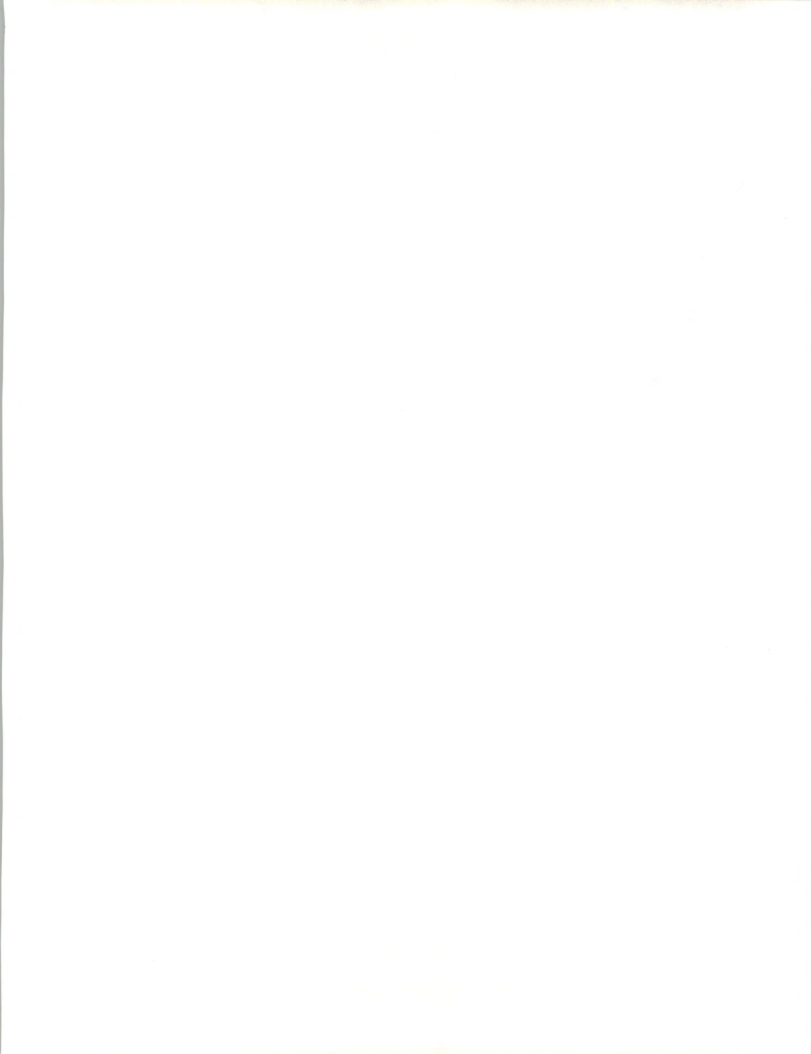
Sources of C/S Applications

- Packages: Nonexistent/fragile
- Internal development
- Professional services/SI:
Quasi-methodologies, experience
- Outsourcing/applications support

SP-227

INPUT

Notes



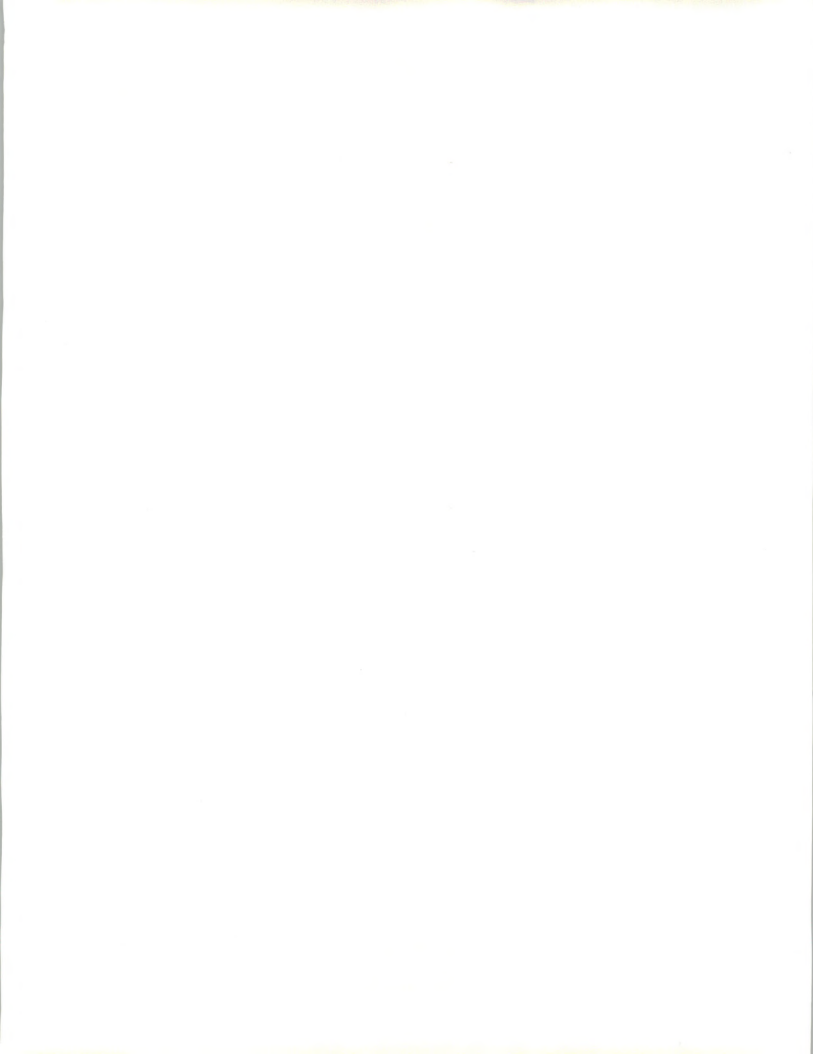
Client/Server Platforms

- Contenders (alphabetic order)
Apple UNIX
NT Windows
OS/2
- Converging functionality
- Consolidation slowed by distributed buying points?

SP-229

INPUT

Notes



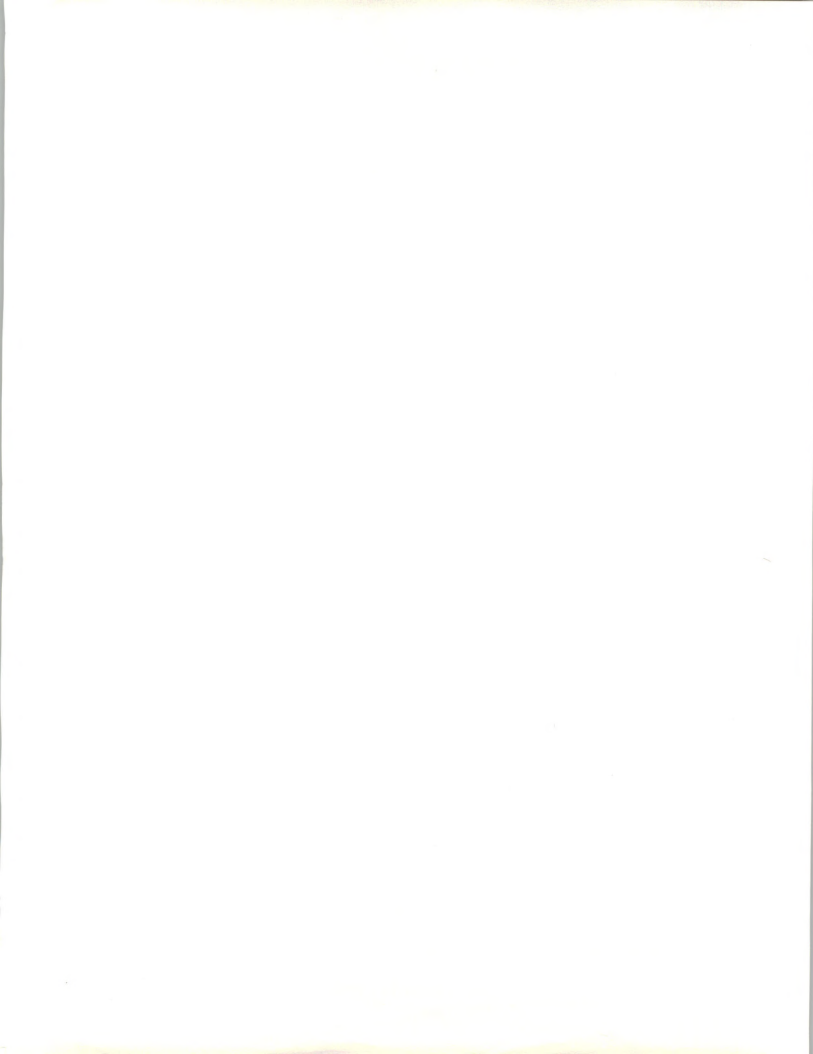
Data Base Interface (Server)

- Many choices, e.g.,
 - DB2
 - HP
 - Informix
 - Ingres
 - Oracle
 - Rdb
 - SQL Server
 - Sybase
- Mini retrofits
- No obvious dominance

SP-230

INPUT

Notes



Small Is Beautiful, but Dangerous

- Lower quality applications
 - PC cowboys
 - Controls, maintainability
- Decay of corporate systems infrastructure
- Software engineering support extremely limited

INPUT

SP-238

Notes

